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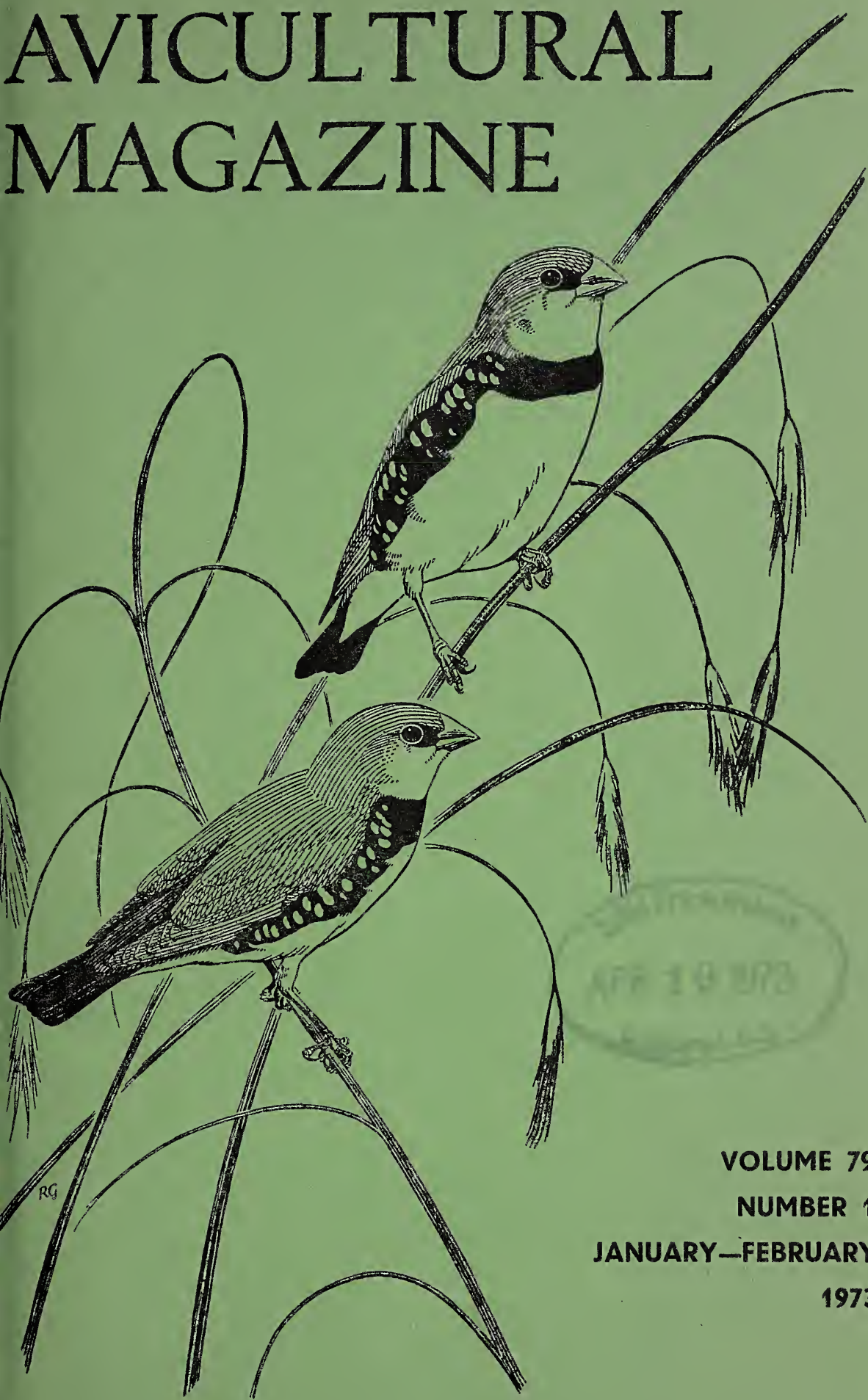
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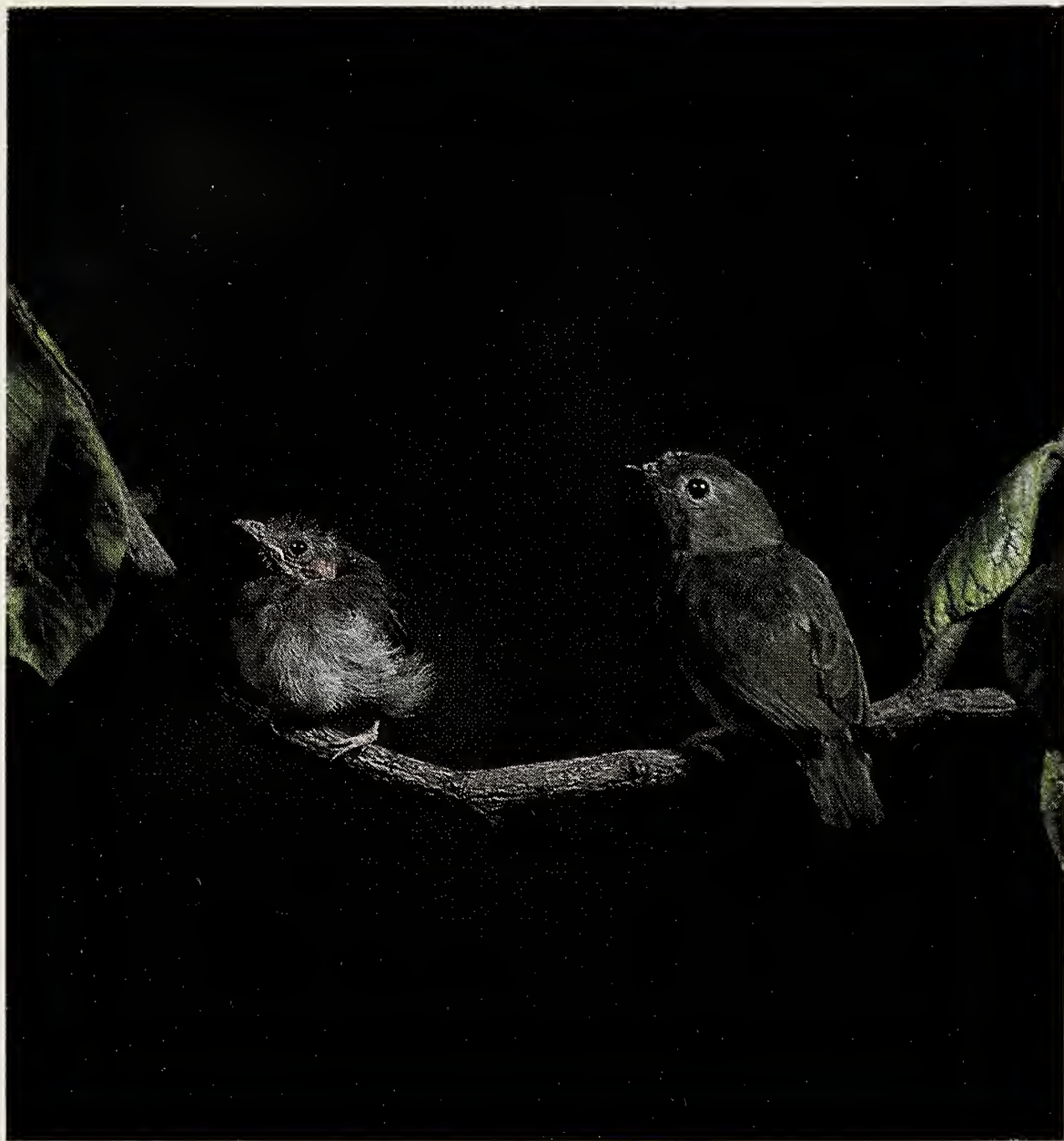
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Blue-backed Manakin and Young

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JANUARY-FEBRUARY 1973

BREEDING THE BLUE-BACKED MANAKIN *CHIROXIPHIA PAREOLA* AT LONDON ZOO

By P. J. OLNEY

The Blue-backed Manakin *Chiroxiphia pareola* has the characteristics of a typical member of its family, the Pipridae. It is a short-toed, stout-bodied, short broad-billed bird about the size of a House Sparrow *Passer domesticus*. In this species the sexes are strikingly different. The male is predominantly velvety-black with a sharply contrasting pale-blue back and a flat somewhat triangular shaped red skull-cap. The legs are pale orange and the eyes are black. The female is far less ornate and is mainly olive-green above with somewhat paler underparts. They are fruit eaters and are found in or by the forests of South America and Tobago.

A pair of these beautiful birds have been kept in the Tropical House at London Zoo since 1971—the female since May and the male since December. The house has a flying space of approximately 65 ft. × 45 ft. with a height of 12 ft. The temperature averages 70°F (21°C), and during most of the year there are normal hours of daylight.

The birds rarely appeared to be close together and it was with some surprise that the female was seen to be sitting on a nest in late May 1972. The nest was an ordinary canary-type plastic pan, 4 in. diameter and 2 in. deep, suspended from the wall some 6 ft. from ground level. The nest-pan had been filled with moss, dead leaves and plant fibres, and the female sat, with most of her body exposed, over a small indentation in which lay the two eggs. The eggs were heavily speckled with chocolate-brown spots on a bluish-buff background. One egg measured 25 mm. × 17 mm. and weighed 2.2 grams. Unfortunately the female was already incubating when the occupied nest was first noticed and no accurate incubation period could be recorded. It was thought to be about 17 days.

Only the female incubated and the male appeared to take no further part in the proceedings after copulation though in a second attempt at nesting he was seen to fly to the nest-pan, settle and begin to shape the cup by turning round while sitting. This behaviour does not seem to have been recorded before as all accounts stress that the female carries out all nesting activities alone.

One egg hatched on the 5th June, the other proved to be infertile. The youngster was fed by the female alone on fruit coated with vionate—

mainly bananas, pear, grape and tomato. Mealworms were seen to be taken to the nest, but were not seen to be given. The fruit was carried in the mouth and bill, and during the first two weeks appeared to be regurgitated but later was fed direct. The partly fledged youngster left the nest after 14 days though it could only flutter from perch to perch and frequently ended up on the ground. As there was considerable danger of it being trodden on, drowned in the moat, or snatched up by a visitor, mother and child were removed to the safety of the Bird House. Here it remained dependant on the mother for a further 14 days, by which time it could fly. The feathering of the head was the last plumage to appear and even when fully winged the adolescent still had a partly bald appearance. Otherwise it was very similar to the female, with olive-green feathering above, and paler plumage below. The legs were pale pink rather than the orange of the adult.

The female was returned to the Tropical House and further nesting activity was seen after three weeks. Two eggs were laid, but proved to be infertile.

Recently, at the beginning of October, courtship behaviour has been seen and this followed closely that described by Gilliard (1959) and Snow (1963, 1971) from birds observed in the wild. As there was only one male involved in this case the interesting and well-recorded co-ordinated courtship dance in which pairs of males would play an equal part could not be observed.

Two forms of stereo-typed display were seen. In the first the male made short fluttering jumps from a low horizontal steel pipe. The ground around this perch was clear of vegetation and fallen leaves, though it was not known if the bird had cleared away obstructions, as reported in the wild (Gilliard 1959, Snow 1963). The bird would alight on the perch, rise into the air and come down again a short distance from where it started—always it seemed to end up on the perch facing the opposite direction to which it started. In the air it would give a low whirring or buzzing call. The display did not last for very long, and it looked as though the jumps became more rapid and less high as the display continued, until finally the bird flew away from the area.

The second type of display was quite different from the jump-display and appeared to be a prelude to copulation. The female was present but partly hidden by vegetation at one end of the display perch. The male rose above the perch, facing the female and almost hovered with shallow rapid rather butterfly-like wing beats. He then landed on the perch in front of the female with his whole body held at an angle so that his pale-blue back and red skull-cap were prominently displayed. This stereo-typed display occurred three times before he flew into the vegetation where he presumably mounted the female. Immediately afterwards he flew the length of the house and then began to feed.

ACKNOWLEDGEMENTS

I am most grateful to the Staff of the Bird House for their considerable help with observations.

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* * *

BREEDING THE RED-HEADED BUNTING *EMBERIZA BRUNICEPS* AT CHESTER ZOO

By WILLIAM H. TIMMIS

(Curator of Birds and Mammals, Chester Zoo, England)

DESCRIPTION

Emberiza bruniceps is sexually dimorphic; the males are "chestnut" (the chestnut pigment is restricted, however, to the whole head and throat; this extends onto the upper breast.) The sides of the neck and entire underparts are bright yellow; the upperparts, mantle and back are olive-yellow streaked with black; the rump and upper tail-coverts are yellow and unstriped. Wings and tail are brown with pale edges to the coverts and there is no white on the tail. One of our males has the head and throat reddish gold instead of the usual chestnut. There is, according to H. Witherby (1938), great individual variation in the males, especially in the colour of the crown, which is from bright chestnut to golden yellow.

The adult female is brown above, streaked with darker brown; the underparts are a mixture of buff and yellow and the rump is yellowish-green with slight brown flecks. The chestnut plumage worn by the male undoubtedly presents the fully adult dress and it would seem from our observations that it is not acquired until the bird enters into its second year.

RANGE AND HABITAT

Although only a rare vagrant to the British Isles, the Red-headed Bunting has quite a wide distribution in the Palaearctic region, breeding in the Aral-Caspian, Transcaspia, Kirghiz Steppes, Turkestan, Semi-palatinsk to Altai region, north-east and east Persia, north Baluchistan and Afghanistan. On migration and in winter from September to March it is found in Sind, the Punjab, Rajputana, the North West Frontier and Kashmir, through the central provinces south to the Nilgiri hills. Whistler

(1949) writes that on the spring passage, vast clouds of Red-headed Buntings along with Black-headed (*Emberiza melanocephala*) occur among the ripening crops; on being flushed they fly into the nearest tree, making it appear a yellow mass, and it is noteworthy that these flocks then consist almost entirely of males. These flocks are very bold and are only driven with difficulty from a field where they have decided to feed, and owing to their numbers they can be responsible for a great deal of damage. In the autumn they also do a certain amount of damage to jowar and similar crops but on that passage they are not usually so noticeable. Out of 16 or so species of Buntings occurring in India the Red-headed is possibly the most numerous.

It has no subspecies but in the south its breeding range overlaps that of the Black-headed Bunting (*Emberiza melanocephala*) and Paludan (1940) records that hybrids between *melanocephala* and *bruniceps* are known from the region south-east of the Caspian Sea, males having heads black and chestnut-brown admixed. Meinertzhagen (1954) writing about *melanocephala* in the Balkans and east Afghanistan, where it hybridises freely with *bruniceps*, states that the latter may well be a race of *Emberiza melanocephala*.

As an accidental wanderer, the Red-headed Bunting has been found in Italy, Belgium, Heligoland, Great Britain and Eire. It inhabits open areas with scrub, cultivations with bushes and thick weeds, also arid desert and steppe land with areas of water supporting reedbeds and bushes. Outside the breeding season it is found largely in cultivated areas and scrub jungle.

HOUSING

Two pairs of Red-headed Buntings were purchased on the 26th May 1971 and after a veterinary examination they were placed in an outside aviary measuring 49 ft. 10 in. long \times 10 ft. 6 in. wide \times 5 ft. 7 in. high. At one end there is a wooden shed measuring 10 ft. 6 in. wide \times 10 ft. 10 in. long \times 12 ft. high, which has a clear plastic sheet roof. The policy of screening the faeces of all new additions to the collection has proved especially valuable in the case of new bird arrivals where considerable worm egg burdens are very often seen. It must also be stated, however, that on certain occasions exotic specimens are received with parasitic burdens which do not respond to treatment during the acclimatisation period. The outside flight is heavily planted with shrubs. These include Privet (*Ligustrum ovalifolium*), Golden Privet (*Ligustrum ovalifolium marginatum* "aureum"), Holly (*Ilex aquifoliaceae*), Laurel (*Laurus*), (*Polygonum cuspidatum*), Gorse (*Ulex europaeus*) and Honeysuckle (*Lonicera nitida*). A large shallow concrete pool is situated in the centre of the outside flight around which are several types of rushes and sedges. One half of the flight is covered in short grass, the rest being washed river sand. Branches cut from beech trees are fixed at various positions both

in the outside flight and inside shed. Other foreign birds kept in the flight at the time of the introduction and eventual breeding included various species of Weavers, Java Sparrows, Cut-throats, Green Singing Finches, Diamond Doves, Zebra Finches, Bengalese, Waxbills and Whydahs.

BREEDING

No breeding activity was observed at all during 1971, the Buntings going into moult in late September. During May 1972 one of the females was seen carrying nesting material into a dense clump of Honeysuckle (*Lonicera nitida*). Upon examination, a completed nest was found, this being abandoned two days later due to Weavers taking a great deal of the nest material. The female started building a second nest a few days later, this being well concealed in Honeysuckle which had grown over a short gorse bush. The nest was completed in a little over four days and was a very untidy cup of grass mixed with dead leaves and long stems of Lucerne. It was lined with hair and fine grassy fibres. Most of the nesting material had been placed in the flight for the Weavers and Whydahs, etc.

The work of building appeared to have been carried out by the female alone. I noticed on several occasions that if the nesting material was collected near to the nest site, the male would perch high on a branch nearby, calling very softly, unless engaged in feeding or territorial disputes. As with our Yellow-breasted Buntings (Timmis, 1972), when the female Red-headed Bunting wandered further from the nest, she was generally accompanied by the male, but he was never seen to take an active part in nest building.

Incubation was carried out by the female only. In a total of over 60 visits to the nest, I always found the female incubating, except on two occasions when no bird was present. Three eggs were laid at intervals of a day; the hatching was completed in just under 22 hours, after an incubation period of 14 days. A very interesting observation was the way in which the female positioned the eggs, which were visible from the side and partly from above. Because of this the female put the eggs on the opposite side of the nest so that they always were out of the line of vision of any possible intruder.

I never observed the male feeding the female on the nest during incubation. The eggs were a ground colour, greyish-white, slightly blotched with greenish brown and spotted all over with light brownish and purple markings. One egg which did not hatch was measured in our veterinary laboratory and measured 21×14.7 mm. In the Handbook (Witherby, 1938) Jourdain gives the following measurements of 22 eggs: average 20×15.3 mm.; maximum 22.16 and 21.2×16.5 mm.; minimum 19×15.6 and 20.2×14.5 mm.

CARE OF CHICKS

The young Buntings were brooded almost continuously for three or four days after hatching and during this period the male was seen feeding the female on the nest. After the period of close brooding by the female, she sometimes brooded the young when the temperature was quite high and at other times she left them uncovered when the air temperature was lower; in fact the brooding did not appear to be correlated with air temperature. The location of the nest, under an umbrella of gorse thorus and Honeysuckle leaves, provided partial protection from the direct rays of the sun and from the worst battering of the rain.

The nestlings were brownish above and had streaks of blackish-brown in parts; the throat was yellowish red, turning to whitish yellow on the chest and lower body. The food given by the parents to the young for the first few days consisted of small insects and soaked seed fed by regurgitation. After about three days the young were fed on caterpillars, mealworms, maggots and soaked seed. The nestlings demanded the constant attention of both parents, calling loudly for more food the moment their bills were emptied.

Nest sanitation was carried out by both sexes although it appeared that far more was done by the female and faeces lying around the rim of the nest was removed by the first parent bird to arrive. I found that only the female examined the interior of the faeces. The chicks did not defecate until they were at least 34 hours old, after which they did so regularly, about every two hours, by raising their cloacas towards the rim of the nest before passing faeces. On some visits to the nest during feeding, both the sexes would take a faecal sac and swallow it, but most times they would fly some distance down the aviary before dropping it. We found that the male took very little part in feeding the young until they were about five days old, after which the number of visits in which food was brought to the nest was approximately equal for the two sexes. If the female was on the nest when the male arrived with food, or in some cases if the two birds arrived at the nest together, the female generally took the food from the male to give to the young.

The fledging period was 15 days and at that stage the young Buntings looked very like the female, except that they were a shade lighter in colour and the bill was greyish-brown above and below. Two Buntings left the nest and for several days perched quite near to the site, occasionally fluttering down onto the ground where they would peck at food when in fact they were not hungry; they also pecked at markings on leaves and on the aviary netting. It appeared to be more curiosity than hunger. If the young Buntings were hungry they always gaped and begged, even begging at food which had fallen on the ground, instead of pecking it up.

The adults continued to feed them for almost two weeks after leaving the nest, after which time they had gained strength and ability to fly around the aviary and fend for themselves.

VOICE

The call of the male is a " chipz-chew " with a pause between syllables like a rusty gate swinging back and forth. This is delivered from a bush or tree. In flight the call sounds like " tchirp " in the male and " chawp " in the female. The song consists of a descending phrase with a kick up at the end, usually preceded by four or five preliminary notes. The last phrase is repeated two or three times without a pause; the song has a number of variants. In flight it runs several times together and also at times is speeded up. We have on occasions heard birds singing whilst on the ground.

As described above, the Red-breasted Bunting, *Emberiza bruniceps*, has been bred at Chester Zoo. It is believed that this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Hon. Assistant Editor.

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* * *

RELEASE OF A CAPTIVE-BRED BARN OWL

(*Tyto alba alba*)

By JEFFREY TROLLOPE (Hounslow, Middlesex, England)

The release and rehabilitation of captive-bred owls has been achieved with planned programmes and feeding support of the birds released. Wayre (1970) has described the method employed for the release and rehabilitation of Barn Owls (*Tyto alba alba*) and Little Owls (*Athene noctua vidalii*). This consists of the release of the young when fledged and feeding them every night on top of the aviary, with the parents kept inside.

DETAILS OF RELEASE

Having bred Barn Owls for three seasons (for first year's results see Trollope, 1971) I decided this year to release one bird as a pilot attempt at rehabilitation. However, living in a very built up, populous and noisy area, the aviary feeding technique used by Wayre could only end in

disaster for the released bird. Therefore I had to find a suitable place for the release, close enough to make nightly feeding visits possible. What I envisaged was a derelict barn or building of large size near a park, or similar area, then to release the bird in the building, which would be used as a feeding site.

This was obviously far from an ideal method, but I thought it worth a try, having postponed such an attempt the two previous seasons. Local bird watchers informed me of a derelict house in a builder's yard, near a large park and golf course, about three miles from where I live. I obtained permission to use it from the manager of the building firm, who was most co-operative.

The bird was released on 7th September 1972. It appeared to be a cock and was the whitest-breasted Barn Owl I have seen, rather paler than most birds on the dorsal surface. It was from a second generation of captive breeding and when released was aged 106 days, weighed 12 oz. and wore a leg ring.

RESULT

Unfortunately the bird left the building on the day of release. This I think was due to three factors:

1. The bird was too nervous to remain in a fairly busy area.
2. The building was not large enough.
3. I released it in the wrong part of the building, where "escape" was too easy.

I continued to leave food in the house in the forlorn hope that the bird would return. Neither the bird watchers or myself could see any sign of the owl during the following weeks. I contacted the local R.S.P.C.A. clinics in case it had been picked up exhausted or injured.

I was consequently both surprised and pleased to see the bird alive and looking fit on the mornings of 8th November 1972 and again on 15th November 1972. On both occasions it was perched on top of a hawthorn hedge which borders the golf course about a quarter of a mile from the release point. Obviously with the winter ahead the bird has a long way to go before it could be considered rehabilitated. However, the fact that a second generation captive bred owl has survived in feral conditions without feeding support for just over two months, I consider to be worthy of record.

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BREEDING THE RED-FRONTED BARBET

(Tricholaema diadematum)

By M. D. ENGLAND (Neatishead, Norfolk, England)

Barbets are close relatives of the woodpeckers and have many of their engaging habits. Their reputation for destroying the woodwork in their aviaries, even to the extent of boring through thick wooden walls and doors, has not made them generally popular with aviculturists, which is a pity, first because they are most interesting birds which well reward study; second because one can suit one's inclinations and have fruit-eating, insect-eating or omnivorous species; third because in my experience their destructive capabilities can very largely be kept within bounds by providing plenty of rotten logs.

The name "barbet" comes from the bristles around the bill (these can be seen in Plate 2) and probably also from the fact that some species have tufts of feathers near the base of the upper mandible. All barbets—and there are over seventy species—nest in holes, some in natural or other bird's holes in trees but most boring their own in rotten timber, sand or earth banks or even perpendicularly downwards in level ground.

My Red-fronted Barbets followed me back in April 1972 from East Africa, where I had arranged to meet Tim Barnley who obtained them for me and saw to their transport. In parenthesis I should like to add that it would have been impossible for greater care to have been taken than he took over the packing and forwarding of these and two other pairs of birds which he sent me at the same time: so well-designed and sturdily-constructed were the travelling-cages that the air freight cost more than the birds!

This is also an opportunity to pay tribute to the powers that be in Kenya for the way in which they control the export of their birds. A permit to trap a bird, or birds, of a particular species has first to be obtained, the decision to award or withhold it being in the hands of a committee which sits monthly in Nairobi, and before the permit is forthcoming the trapper has to pay a fee equivalent to 10% of the amount which he will receive for the birds. This permit is for a bird or birds of a given species, and alternatives are not allowed: for example, to make things easier—as I thought—I asked for one pair of either of two species of barbet, but this was not allowed and I had to specify exactly which. How very cheering it would be if all countries would adopt a similar attitude to the trade in their native birds, so that a stop might be put to the excessive drain upon the wild which is now going on.

Red-fronted Barbets are locally common from Southern Sudan and Central Ethiopia south through Kenya and Uganda to Tanzania and Malawi, and they are inhabitants of the bush country and especially in acacia woodland near water-courses. With the exception of Tinker

birds they are among the smallest members of the family, being about nuthatch size though rather shorter and plumper, and their habits and general deportment might be described as a combination of nuthatch and small woodpecker. They are generally black above with yellow streaks, and white to yellowish-white below; some birds have the very faintest trace of brown spots on the lower breast. They have a bright red forehead and pale yellow superciliary stripes shading backwards into white. They have a moderately long, stout black bill and dark grey legs. The sexes are alike in plumage.*

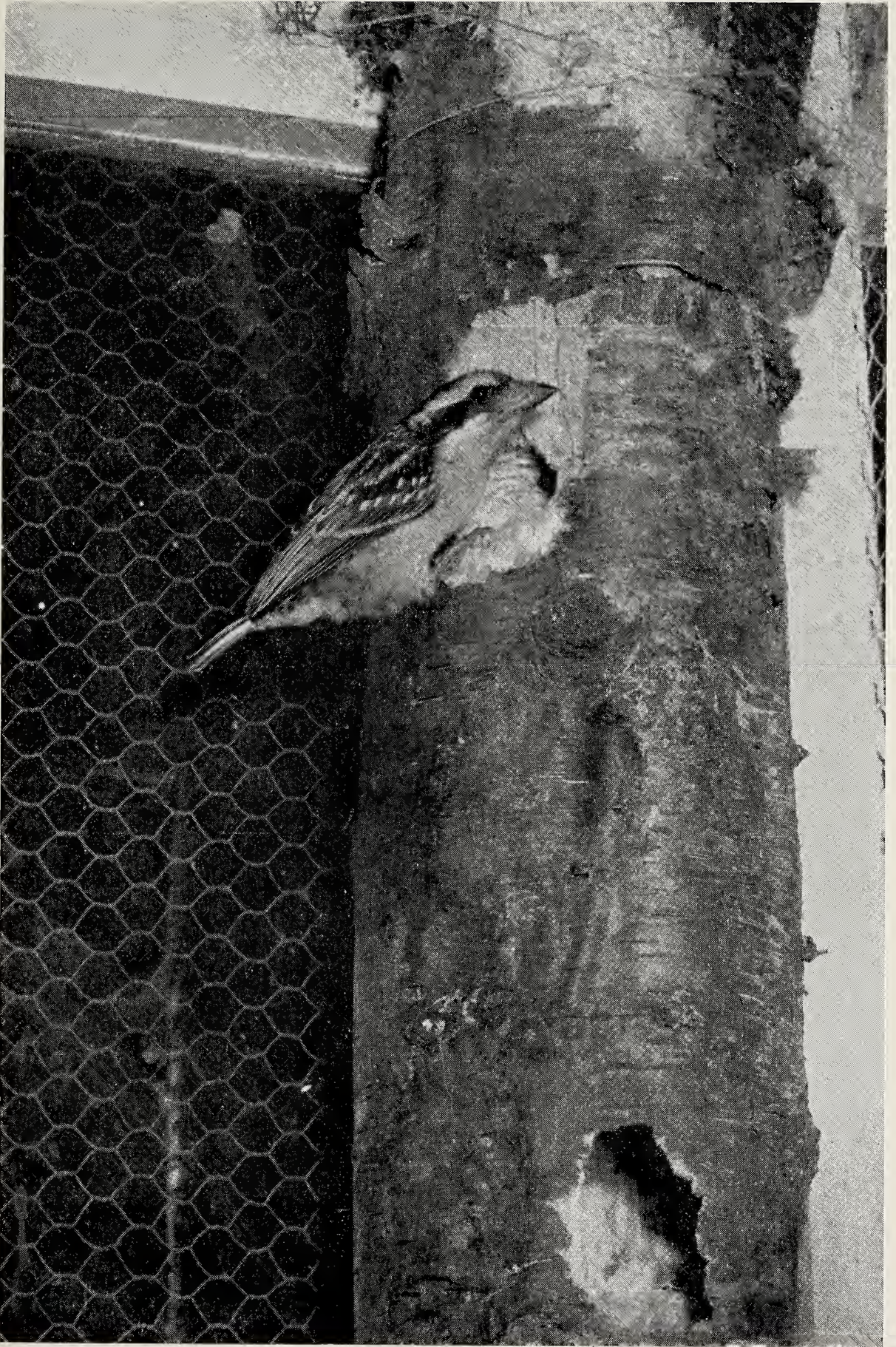
When mine first arrived they very obviously disliked the cold of a British April—or rather the 60°F at which my bird-room was kept, and they looked very unhappy until I put an infra-red lamp on them, although they fed well from the start. After a week or two they were allowed into the flight—24 ft. × 4 ft 6 in.—and, despite miserable weather, they immediately improved. They are not happy in close confinement, even though in this case the “confinement” consisted of a section of birdroom 8 ft. × 5 ft. × 4 ft. 6 in. Needless to say I gave them no companions.

It was not long before I was fairly sure that I had two birds of a sex, probably males. One was aggressively dominant to the extent that the other began to skulk in the shelter, seeming unwilling to go out into the flight when the other bird was there and only dared to snatch a bit of food while fearfully “looking over its shoulder”. On the other hand, only the dominant bird was noisy while the other has never been heard to utter a sound, but I was pessimistic enough to think that this was due to their very unbalanced relationship rather than to the fact that they were male and female, especially since vicious chasing had begun and I was beginning to consider the need to separate them. My pessimism grew worse when one of them took over a nest-box at the far end of the flight while the other started boring a hole in a rotten tree-stump in the shelter. However, gloom eased a little when relations improved sufficiently for both of them to take turns at boring.

Their method was interesting: each would attack the wood, hammering away until a piece was loosened at one end; this was then seized and torn off and, when a large beakful was free, it was carried to the far end of the flight and dropped on to an ever-increasing heap. Amazingly, small pieces of wood were swallowed and *regurgitated* on to the heap; practically nothing remained beneath the hole to give away the site to enemies. The entrance hole was small for the size of the bird—a very tight squeeze—and was not perfectly round but rather irregular like that of a Willow Tit, *Parus montanus*.

Hopes really did soar when courtship feeding and then mating were seen (the dominant bird was the male), and one bird began spending long periods in the hole. Meanwhile, relations continued to be intermittently very

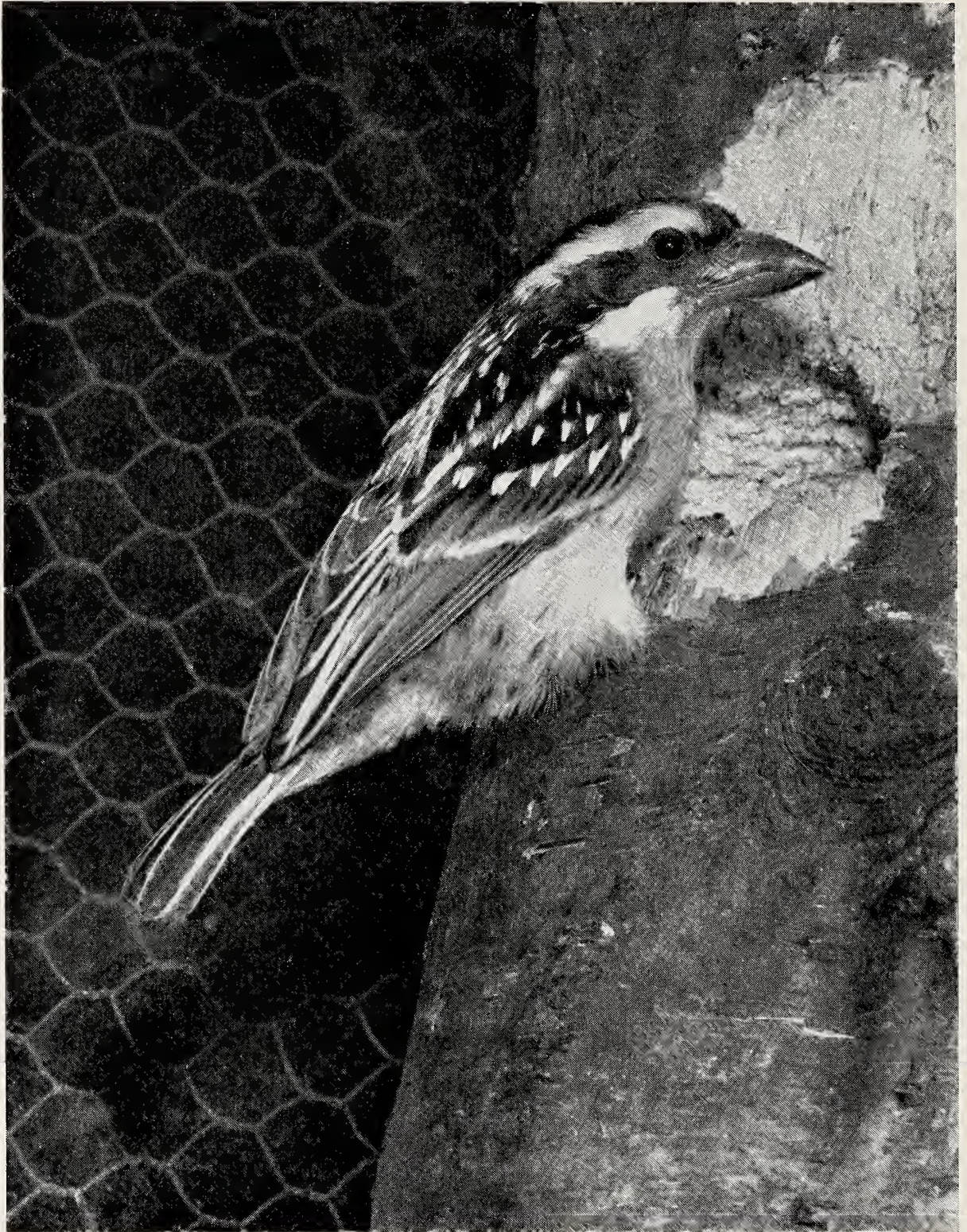
* Subsequent close examination has shown that in this pair the male has rather more red on the forehead than the female.



Copyright]

[M. D. England

Adult Barbet at nest-hole. Note nest-cavity, opened up by the
birds, at foot of picture



Copyright]

[M. D. Englnd

Male Red-fronted Barbet at nest-hole. Note the shape of the bill which is used for gripping and tearing

strained, and the vicious chases were all the more alarming since they did not culminate in mating, and appeared to be done out of pure spite. Whatever their cause, there can be no doubt that the female spent a great deal of her time absolutely terrified of her mate. Mating took place in a most casual manner, with no preliminary display, after the two birds had one of their rare periods of sitting peacefully side by side preening. Far more often than not it was unsuccessful.

Any hope of breeding disappeared when one morning it was seen that there was a gaping hole in the side of the log: they had opened up the nest cavity, whether from inside or out we could not tell. So that was that, and "summer" was fast passing. A new log was put up in place of the old (they had in fact a choice of five logs in the aviary), but they ignored it and it seemed as though even their very half-hearted desire to breed had left them. In a final attempt to stimulate them I cut a hole in the bark and exposed the soft wood within—immediately they started to bore. Again they took it in turns, and again they carried their winnings to the far end of the flight, where they filled their bath with them. Since they are reputed to favour the vicinity of streams for breeding, one is tempted to wonder whether this depositing of wood-chippings in their bath was the equivalent of dropping them in a stream where they would be carried far away from the vicinity of the nest-site.

Although it was impossible to be quite sure when it started, there was soon little doubt that incubation was taking place, since frequent nest-relief was seen. The relieving bird did not by any means always wait for its mate to leave the nest, but either clung to the tree outside the hole (presumably making a noise that I could not hear) or went inside and down to the cavity. Sometimes both were in together for quite long periods. This made it equally impossible to be sure when hatching took place, but it was a few days before the 26th August, on which date my diary reads: "R-f Barbets feeding hard, mainly on chopped lettuce. Swallow food and regurgitate—do not carry it in bill. Do not always allow very long for digestion, sometimes as little as two minutes."

For the first few days chopped lettuce and chickweed was the favourite food, but the youngster's menu was gradually enlarged until it was being fed on the widest variety of food that I have ever experienced—all, of course, regurgitated by the parents: chopped lettuce, chickweed, grated cheese (little), chopped hard-boiled or scrambled egg-yolk, soft food, chopped raisins and currants, apples, mashed carrot (little), maggots (few), mealworms and small locusts. Until 9th September (that is for over a fortnight) one parent was almost continuously in the nest, and from 1st September faeces were seen to be carried away; presumably it had been swallowed prior to this.

On 9th September, and thereafter, both parents were off most of the time, though both continued to visit the hole to feed at frequent intervals—surprisingly frequent considering that regurgitation was employed.

During this time persecution of the female by the male intensified, to be interrupted occasionally by brief periods of truce when courtship-feeding and mating took place. On 22nd September a youngster was looking out of the hole and was being fed by the male with egg-yolk in beakfuls, not swallowed and regurgitated. The female continued to feed by regurgitation, using a rapid "pumping" action with the bill inserted far into the youngster's gape.

On the 23rd our hopes received a crushing blow—the nest-compartment had been torn open again and there was no sign of a youngster: a thorough search of both flight and shelter failed to find even feathers, the nest had not even any broken egg-shells in it, and the parents seemed completely unconcerned. I was miserably leaving, after another fruitless search, when a very faint noise caught my ear—and there was a youngster looking out of the hole; it had been "up the spout" all the time, clinging between entrance hole and nest-cavity. That night it descended to the nest to roost (in full view, of course) and the next morning left it for good. Rather unexpectedly it did not return to the hole at night, but roosted out in the flight with no shelter whatever. Meanwhile, the female parent had dug herself a roosting hole in another tree, which she continues to use.

As will have been gathered, there was only one youngster, and no evidence at all of there ever having been more, or more than one egg. The one which was reared, however, was fully developed on leaving the nest, and was indistinguishable from its parents except on very close inspection, which showed that the small patch of red on the forehead which gives the bird its name was replaced by black. A very faint mewing, to human ears audible only from a few feet, which was heard on its last day in the hole, and again when it was caught up for ringing, is the only sound it has been heard to utter, and its mother never seems to make any sound at all. The male has three calls, one of which—a not very loud he-he-he—very similar to the call of the Lesser Spotted Woodpecker, *Dendrocopos minor*—was heard a few times only when the birds first arrived. His main breeding-season call is a rapid version of the "poo" of a Hoopoe *Upupa epops* repeated six or more times, often, though not always, with an accelerando towards the end. This is uttered with the bill pointing downwards and the throat "blown out" in a similar fashion to hoopoes and coucals. His other call, which is probably a contact call and, I suspect, would also be used by the female were she not so persistently in a cowed state, is almost exactly a louder version of the call of an Owl Finch (Bicheno or Double-bar) *Poephila bichenovii*, a rasping nasal *aark*.

SUMMARY

The breeding in an aviary of Red-fronted Barbets *Tricholaema diadematum* is described. They bored a hole in a rotten stump of Silver Birch *Betula pendula*, but this was left unused after they had broken open the nest-cavity. A second hole—in another log of rotten Silver Birch—

was bored by both birds and one youngster was reared in it. This was fed by regurgitation by both parents, which also shared incubation and brooding. Incubation and fledging periods could not be ascertained, but the latter was certainly in excess of 28 days, though probably not much so. On the last day before the youngster left the nest, the nest cavity was opened up in a similar fashion to the previous one, as also was the hen's roosting hole.

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As recorded above, the Red-fronted Barbet, *Tricholema diadematum*, has been bred by M. D. England at Neatishead, Norfolk; it is believed this may be a first success.

Any member or reader knowing of a previous breeding of this species is requested to communicate at once with the Assistant Editor.

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PARROT NOTES

By GEORGE A. SMITH (Peterborough, England)

In my article on nesting and nestling parrots (AVICULTURAL MAGAZINE, 1972, pp. 155-164) I was foolish enough to write that parrots appear to make no attempt at nest sanitation. This is certainly not true for Black-headed Caiques *Pionites melanocephala* and with hindsight have reason to suspect that it is untrue for other parrots. Parent caiques scratch the soiled litter out of the nest-hole and continually chew splinter from the inside of the box to refurbish the floor covering. It was only when the supply of soft wood, nailed inside the box for this purpose, was totally chewed away that the nest became fouled by the chicks.

This could well be the explanation of two puzzling features of brush-tongued parrots (Lories). Why do these birds, lapping nectar and eating soft, yielding vegetable substances need such a powerful bite to their beaks? Keas, for example, which are the size of a Raven are caught by an ungloved hand to be leg-rung, or killed for government bounty money, without giving the handler other than the slightest inconvenience (Jackson, in corres.). I only hold lories, as other parrots, in my naked hand after catching and positioning them in a hand-net as they can give nasty, blood-drawing bites.

My second perplexity with brushed-tongued parrots was as to why the youngsters, in captivity, are almost invariably badly plucked while in the nest? Some other "sorts" of parrot chew their youngsters' feathers. Mostly, I feel, for some aggressive reason as the skin is often marked and the head often suffers; but with lories it is the whole body, save wings and tail, and the head feathering is left intact making them look as if they had had a "pudding-basin hair-cut".

I now believe, partly proved by the manner in which nest-boxes are "eaten" by these birds, that in a "natural" nest cavity the parents would rain-down—by chewing—a periodical shower of parings to absorb the faeces of the young. The plucking of the chicks can then be seen as done to "satisfy" this parental instinct. Dilger notes that soiled nests stimulate parent lovebirds to fetch further quantities of nest litter. This need to pare would satisfactorily explain the powerful bite of these birds.

While on the subject of nests much has been made of a species of moth whose larvae feed in the nest litter of the Golden-shouldered Parrakeet *Psephotus chrysopterygius* (e.g. p. 109 in Immelmann's *Australian Parrakeets*).

My own nest-boxes commonly house two species of moth: the Clothes moth and the Flour-moth—which, if my (schoolboy) memory serves me right, is *Esphestia kuhniella*. The Clothes moth feeding on feathers and "scruff" and the Flour moth, in its cobweb tube, living on the rich organic dust thrown up by the birds. Most damp nest-boxes have Housefly *Musca domestica* maggots feeding in the top layers by the late summer and early autumn; perhaps a more careful survey would reveal more cases of "commensalism".

In their article on the behaviour of some African parrots the Holyoaks (AVICULTURAL MAGAZINE, 1972, p. 89) suggest that Budgerigars and Grass-parrakeets *Neophema* spp. hold food steady by standing on it when they eat. They also say that *Poicephalus* parrots pick food items directly up with a foot and then transfer it to the bill. I have tried to entice literally scores and scores of Budgerigars and Grass-parrakeets to use the feet when feeding on millet spray and Annual meadow-grass *Poa annua* pannicles. I try to present this in such an awkward way—part pushed through the wires or laying across a perch—that they should find it easier to use the foot than to feed directly. I have yet to see a Budgerigar even attempt to use its foot. Brockway (1964, *Behaviour* 22, p. 200) who has made a detailed study of Budgies says that they make no feeding use of the feet. Some individual Grass Parrakeets will use their feet to clasp food to the perch—especially Blue-winged and Elegants *N. chrysostoma* and *N. elegans*—it is less common in Turquoisines *N. pulchella* and I have yet to see Splendids *N. splendida* or Bourke's *N. bourkei* involve the feet in any way. Because the inability to use the feet is a recent development it would be highly improbable if all Budgerigars or grass-parrakeets were incapable of using the feet.

But for the two exceptions listed in my article on the use made by parrots in feeding (AVICULTURAL MAGAZINE, 1971, pp. 93–100) I have not seen a parrot directly take an item up in the foot. The following letter, from Mr. Mats Tell of Ljungbyhed, Sweden, has some interesting points on the use of the foot. He writes: "I should like to report two rather interesting observations on my own birds.

1. TURQUOISINE GRASS PARROT

A 1969-bred cock was seen, for the first time, using his feet when feeding in the 1971 breeding season. When rearing chicks, he was every day given large quantities of different green food. He would then fly down, bite off a clover blossom, grasp it in his foot and eat it just the same way as a Rosella. I have never seen him handle other green food in this way, although I think dandelion seed-heads would be very suitable. None of the young have hitherto developed their father's unique habit, nor have I seen or heard of it before. None of my friends, many of whom have fine *Neophema* collections, have ever seen it among their birds.

2. STANLEY ROSELLA

One of my cocks is especially fond of pears. Fallen pears are often pecked upon by wild Blackbirds and Fieldfares and I often throw these into the Stanley aviary (of course I never normally give my parrots fruit on the floor). This particular cock often bites off a considerable piece and eats it, holding it in his 'hand' in a normal way. However, when disturbed—say, when a Buzzard is flying over—he drops it and, still watching the Buzzard, picks it up again *with the foot* when the 'enemy' is too far away to be considered as a danger. All my other Stanleys (when in a similar situation) pick up their food with their bills."

It is rather difficult to obtain certain information on behaviour and I would be most grateful if someone could tell me whether male Amazon (*Amazona*) and Red-vented (*Pionus*) parrots when pairing, like all the other observed American parrots, keep one foot on the perch and place but one on the back of the female? All the Old-world parrots stand with both feet on the back of the female.

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BIRD BREEDING AT CLÈRES IN 1972

By Jean DELACOUR (Clères, France)

Practically every year one has to state that the weather has been unfavourable, in one way or another, for the welfare of exotic birds in the supposedly privileged climate of North-Western Europe, and 1972 was no exception.

At Clères, after a warm month of March, April, May and even early June were unusually cold, windy and dry, and so, on the whole, was the summer. That indeed interfered with the satisfactory reproduction of many species, and numbers of infertile eggs resulted, as males simply failed to come into breeding condition at the proper time. It was very disappointing. But let us forget failures and remember mostly successes.

The two pairs of Emus again did well, producing 26 young. The Rheas however again laid very late, and only two (one white) were raised.

Wattled Cranes and Demoiselles laid clear eggs, but we reared a Black Crown Crane. Since 1920, when some of those birds first arrived at Clères, this is only the second time that eggs have been laid. In 1939 a mixed pair Black \times Grey had nested, building in August a large nest of seeds and grass and laying three eggs. They all hatched and the young were reared, only to disappear at the beginning of the war.

There are at present in the park and gardens seven Black and ten Grey Crown Cranes. This year, a pair of Blacks set up a territory and laid close to the fence along the river. The nest was very small and only two eggs were laid. The parents were wary and the female often left the nest, finally deserting the two chipped eggs for some unknown reason. They were picked up cold, but one chick was saved and successfully hand-reared.

A pair of Black-necked Swans nested twice, first in March, then again in July, after they had reared the first brood. They hatched six, then seven cygnets, but reared three and four only, the female killing several chicks after a couple of weeks, a very strange performance.

Two pairs of Cereopsis Geese, each isolated in a large meadow, hatched and reared 12 goslings, both in February. Other goslings raised include Swan, Greylag, Snow, Bar-headed, Giant Canada, Néné, Black Brent, Magellan and Ashy-headed. Several Emperor and one Ross's chicks died by accident. A special mention must be made of two young Red-breasted goslings reared; a poor performance as we have seven pairs on the grounds. One of them is partly albinistic; while the head and neck are hardly paler than in normal specimens, with the usual complicated pattern, the rest of the plumage is generally grey instead of black, with pale grey blotches and white markings.

There were a number of Common, Ruddy, South African and Paradise Shelducks; also 17 Moluccan Radjahs from one pair which laid three

clutches clear; the old pair of Australian Radjahs, the last one in Europe as far as I know, again laid eleven eggs; I am afraid they are past the age of successful breeding. A brood of 11 Maned Geese was raised by the mother.

A number of various ducklings were lost owing to an epidemic of salmonellosis, for the first time at Clères, but others were reared, both in pens and at liberty, including Yellow-billed, Indian Spot-billed, Pacific-grey, Philippine and Hawaiian Mallards; Gadwalls, Pintails, Shovellers; Bahamas; Mandarins and Carolinas; Puna, Silver, Cape, Sharp-winged Teal; Pochards, Red-heads, White-eyes, Australian White-eyes, New Zealand Scoup. Unfortunately, unwanted hybrids cropped up, particularly Baer Pochard \times Chestnut Teal, Brazilian \times Chestnut Teal, Brazilian \times Kerguelen Pintail, Chiloe \times European Wigeons. The first mentioned are handsome, intermediate in shape between the parents, the male a bright, purplish-chestnut shot with metallic reddish all over.

An interesting incident occurred with an old pair of Silver Teal, which had long been secluded on a small pond for breeding purposes, but had failed to produce healthy chicks the last few years. They were released on the lake to make room for a younger pair, the result being a happy one: the old birds did rear there three perfect youngsters.

Game birds were not very successful. The world is now so polluted and infectious diseases so widespread that it becomes difficult to cope with such dangerous conditions, particularly on grounds where they have been kept for so long. Only Junglefowl were raised in numbers. Jabouille's Red, Ceylon and Sonnerat's, and of course the commoner species such as Golden, Amherst's, Swinhoe's, Silvers. But we had only a few young Siamese and Malay Firebacks, two Monals, seven Edwards', many peafowl, and one Bare-faced Curassow (*C. fasciolata*). The Brush Turkeys did poorly, although nests were well built and attended, only one chick came out.

Many Pigeons and Doves were reared: Olive (*C. arquatrix*), Wongas, Bar-tailed (*M. unchall*), Mountain Witch, Bleeding-heart, Lemon, Bronze-winged, and several other more ordinary species.

The number of Parrots kept at Clères has to be somewhat limited as we do not particularly enjoy the bare, unplanted aviaries required by these destructive birds. There are however two free-flying Macaws, female Red and Blue and Blue and Yellow, plus a somehow crippled male of the latter species (*ararauna*). No more can be let out as the resident birds would drive them away. There was a nice colony of Quaker Parrakeets at liberty, but local Jackdaws, which breed on the high walls of the chateau, incessantly attacked them, taking over their huge nests of twigs, and finally they went away.

Some 20 specially built aviaries are inhabited by Cockatoos (including Leadbeater's), Macaws (Leah Ambiguous), Amazons and other Parrots and Parrakeets. Two Crimson-winged were reared and Bourke's breed

in a large planted flight, as they are almost the sole members of the family they do not damage vegetation.

Seven species of Touracos live at Clères but only one, Knysna, have bred successfully this year, two pairs producing six young, three of which reached maturity. A regrettable accident took place after two young, just out of the nest, were removed when the male, evidently disturbed, killed the female.

Three Kookaburras were hand-reared, the eggs being removed and hatched in an incubator, as the parent birds have developed the habit of devouring the chicks as soon as they are out of the shell.

We had some success with Passerine birds. Over 20 Superb Spreos, several Diamond Sparrows, and two Baltimore Orioles were raised in the aviaries, the latter species probably for the first time in Europe. We also hand-reared five Fairy Bluebirds, three Orange-headed ground Thrushes and one Fulvous-fronted Parrotbill (*Paradoxornis fulvifrons*), all of them taken from the nest when eight to ten days old. Several broods of these species had met with failure in aviaries earlier in the season, the chicks being killed in the nest by other birds when the mother began to leave then unattended during the day, or soon after they had left it. The breeding of a small Parrotbill, or Suthora, is probably the first of that genus in captivity. All these hand-reared birds are, of course, delightfully tame.

Black-eared Weavers (*Malimbus melanotis*) built several beautiful hanging nests and laid, but no chicks came out. Rothschild's Starlings, White-winged Blue and Black-faced Scarlet Tanagers did not rear their young this year. Tacazze Sunbirds also failed and a female Violet-eared Hummingbird built several nests without laying. A deplorable loss was that of a cock Scarlet-necked Tanager (*Anisognathus igniventris*), killed by another bird (possibly a Pink-crested Touraco) when a brood of two had just hatched in a privet bush. The female failed to raise the chicks.

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BREEDING OF THE ROOK, *CORVUS FRUGILEGUS*, IN CAPTIVITY

By DR. PETER R. RICHARDS (Cookham Dean, Berkshire, England)

I have been interested in the Rook for many years, and have been keeping them in captivity since 1951, when I had hand-reared my first fledgling. I qualified in Medicine in 1959, and as I had to take a resident appointment in hospital, I reluctantly passed on my birds to Dr. Coombs, of Perren-ar-Worthal, in Cornwall; but from 1966 onwards I was able to keep the Rooks again.

The birds live in an aviary, which is situated in my garden. It is 18 ft. wide, 24 ft. long and about 8 ft. high. It is irregular in shape, and built between two large elm trees. The floor is earth, and turves of grass are laid every few months, but are rapidly destroyed by the birds.

There are no natural perches, but artificial perches are provided in many parts of the aviary. As some of the birds are crippled with injured wings all the perches are near to the ground to enable the birds to climb up if they cannot fly.

The aviary is surrounded with 1 in. mesh wire netting. Some protection is provided from the rain, by means of corrugated polythene sheeting, but that is all.

Nest sites are provided, by selecting branches with natural forks and cutting them to suitable lengths. They are then placed in the aviary about 6 ft. apart. Rooks show an interest in nesting material at all times in the year, except in mid-summer when they are going through the post-nuptial moult. I find there is no difficulty in inducing them to use these nest sites, but, as it takes rather a long time for the birds to lodge the first few sticks in the fork and form a foundation, I usually assist them by tying a few twigs into the site I have selected. I choose a site about 6 ft. from the ground, and in a position where I can clearly observe the nesting behaviour.

There are no other species of birds in the aviary now, but at one time there were some jackdaws, *Corvus monedula*.

A bath is provided in the form of an upturned dustbin lid, and the water is changed daily. All the birds take at least one daily bath.

In 1966 I started keeping Rooks again, this time finding a late fledgling on 1st June, in Norfolk. This bird turned out to be a hen, but unfortunately I was unable to acquire a mate for her until the summer of 1968. This pair are later referred to as Pair A.

Nothing daunted this hen fell madly in love with my collie bitch, and in April 1968 laid a clutch of eggs. These inevitably were infertile, and I put some wild rook's eggs under her. She hatched these, but alas the young perished from starvation after a few days, because at the time

I did not realize the female rook contributes practically nothing to the nourishment of her young until they are well feathered.

The following year in 1969, she laid again, in the meantime pairing with a crippled cock rook with an injured wing. Unfortunately, this was unsuccessful, as the cock ate every egg she laid, and has done so ever since.

In 1970, this Pair A laid again, but her eggs were again eaten. By that time I had acquired several more rooks, so that in 1971, I had three adult pairs and some yearlings. A hen that had been brought to me in 1969, aged two years, and another old cock rook with a broken wing, had paired up (Pair B). They made a fine nest in early 1971, starting building on 27th February and completing by 25th March. She laid four eggs, the first on 28th March, and the last on 4th April. They hatched after 19 days incubation, the first on 15th April and the last on 19th April. I was not adequately prepared regarding the amount of food that the young would require, and the young perished by the 25th April. She laid a second clutch of eggs, between the 4th and 8th of May, but none hatched.

In 1972, I still had the original hen, but the cock I had given to a friend, and alas the hen has made no effort to pair with any other rooks and did not nest at all.

The second pair, Pair B, that bred in 1971, started nest building on 4th March. They chose a new site as a younger pair, Pair D, had usurped their original site, and had built a nest that contained eggs by the 8th of March. The nest of Pair B was completed by the 12th March, and she had lined the cup of the nest by the 13th March, and was becoming broody and begging constantly for food with a wing shaking, juvenile gesture, and the typical, high pitched caw that is so prevalent in rookeries at this time of the year.

Nest site selection seems to be made by the hen, but nest building is conducted by both sexes. Much of the material is brought by the cock, and the actual construction is largely conducted by the hen. The hen contributes largely to the lining.

Perfectly adequate nests can be built by single birds of either sex, as I have found that cocks who have lost their mates will continue to complete a nest, and hens, for example A, can build and complete a nest in the absence of a suitable mate.

The first egg was laid on the 15th March, the second on the 16th, until the clutch was complete on the 22nd March, consisting of six eggs.

Incidentally, Pair D suffered from the same fate as Pair A; the cock ate all the eggs. He was released, and can be seen strutting about Hyde Park and Kensington Gardens, one of the only two resident rooks in Central London. The hen accompanying him was also one of my birds, a particularly aggressive bird that I released at the same time because of the trouble she caused with my little colony.

The hen of Pair B sat well and was regularly fed throughout incubation

by the cock. The first two eggs hatched on the night of 2nd April (19+18 days) and another egg hatched on the 3rd April (18 days). The fourth egg hatched on the 4th April (18 days) and the fifth egg, unfortunately, cracked and the young died in the shell. The sixth egg hatched on 6th April (16 days).

The young were grey-skinned with orange gapes when hatched, but quickly grew until they had doubled their size by the fourth day, when their skin had become quite black, and their gapes changed to carmine pink. Feather tracts were making their appearance by this time. The male rook was entirely responsible for feeding the young. The female brooded all the time, only getting off the nest to stretch herself and uncover the young when the male came to feed. Oddly enough, as has been noted in the wild, when the cock arrived to feed the young the female begged intensely for food, and only passed food onto the chicks when her own hunger was satisfied. It was difficult to supply enough maggots, for feeding the chicks, as these were used to the exclusion of everything else, and the other rooks in the aviary also would eat up any maggots I supplied in preference to their usual diet.

By 11th April—8 days, the first feathers on the back were through, but unfortunately the food supply was not meeting their demands, and on the 11th the youngest chick died of starvation, and on the 12th another died, so I decided to hand-rear the remaining three myself.

The chicks that survived were ringed on the 12th April, aged 10, 8 and 6 days. On the 13th April the oldest chick's eye opened, aged 11 days, and the smallest chick remaining died, leaving me with only two.

By the 17th of April the two chicks were gaping at my finger, and their sight was obviously quite good.

Fortunately, although I hand-reared the first two chicks successfully, on the 19th April the hen bird started relining her nest again. I had reduced the number of rooks I was keeping from ten to six, releasing some birds in Hyde Park.

The progress of the hand-reared rooklings was as follows:

By 14 days the feathers through on the back of the head, the back, the scapula region and the primary and secondary flight quills were growing fast. They grew very rapidly on a diet of chopped-up, day-old chicks and a mixed mash of Lowes Meat Chips, layer pellets, bread soaked in egg, corn, farlene, Sluis soft-bill, and groundnuts, on which the adult rooks are basically fed.

By 21 days they were standing up and attempting to preen, their flight feathers were about 1 in. long, and their legs had reached adult size. By 25 days they were standing and flapping their wings and their head and body growth was approximately completed. By the 27th day they were standing on the edge of the nest, and on the 28th day they could stand on one leg and scratch. By the 30th day they perched alongside the nest, and by the 33rd day they could hop from one side of the

nest to the other. On the 35th day they could fly adequately. Their wings were able to support their weight, but their tails were still about half grown. It was not, however, until the 44th day that their wings and tails had become fully grown, and they were not feeding completely independently until August, although they could pick up food for themselves by the 11th June (69 days). One of the two hand-reared birds escaped, a hen, but the other, a cock, is alive and has moulted well.

A second brood followed a similar pattern, but by supplementing their food supply by hand, the young in the nest had adequate supplies of food, with the food brought to the young by the cock bird. I was able to rear two chicks in the nest to maturity and to observe their parents' reaction and behaviour.

The hen began to reline the nest on the 19th April, and the first egg was laid on the 21st April. The clutch was completed by the 26th April, and consisted of five eggs. The first two hatched on the 9th May, and no others hatched, although one egg disappeared. The cock bird was observed to remove the eggshell when the first egg hatched. The chicks grew and behaved very similarly to the first brood, but because the rooks were better at nest hygiene than I could be, numerous observations were apparent that I missed in the hand-reared, first brood. The chicks were covered with a fine down by eight days, and the parent birds spent a lot of time preening and cleaning the young birds.

By the 19th day the young were well feathered, and the parent birds, who up until this time tolerated my presence at the nest without getting upset began to get very alarmed. My presence would cause great consternation and alarm calls, the harsh grating caws were uttered, upsetting all the other rooks, and the young rooks that I was feeding at about four hourly intervals ceased to beg for food, and cringed in the bottom of the nest. The hen bird ceased to brood the young continuously on the 29th May (21 days) and was seen to collect food and feed them herself for the first time. She did not brood again after 3rd June, by which time the young were 26 days old and were standing on the nest and flapping their wings.

On the 7th June (30 days), they perched on sticks near the nest, and they were flying by the 9th June (32 days). They, however, still returned to the nest to roost until they were 34 days old.

The hen rook was responsible for most of their feeding, after leaving the nest, the cock rook having started moulting.

I still have one of the first brood, but I exchanged the young of the second brood on the 30th June, aged 53 days, for some other birds.

The young birds were not molested at all by the other adult birds at any time. The parent rooks defended intensely the immediate tenancy of the nest, in a radius of about one metre, and would not permit any other bird within this area, the hen's territorial aggression being more intense than that of the cock, which I have noted with all my rooks. When the

young left the nest they seemed to be quite confident of themselves, and showed aggressive postures to strange birds that approached too close, and were respected by other birds in the aviary. In fact, the young birds have always been quite high in the hierarchy within the aviary. It is only in autumn when the adult birds have completed their moult, and are sexually highly active again, and the young birds are not showing any overt sexual behaviour that they have slipped in the social hierarchy.

I think the successful breeding of these birds can be attributed to there being a stable colony in which the individuals interact and stimulate each other, and also to the large amount of live food in the form of maggots and wax-moth larvae they receive.

I must say that since receiving the regular supplies of live food their plumage has improved, and even in the wettest days their feathers retain their sheen and water-repellant qualities.

As described above, Dr. P. R. Richards has bred the Rook, *Corvus frugilegus*. It is believed that this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Assistant Editor.

* * *

BREEDING THE CASQUED HORNBILL AT "BIRDWORLD"

By MRS. P. M. HARVEY (Holt Pound, Farnham, Surrey, England)

Early in April it was noticed that the pair of Casqued Hornbills, *Bycanistes subcylindricus*, we had had for two years appeared to be coming into breeding condition. They spent a lot of time preening and feeding each other, the cock bird feeding the hen with far more animal food than usual, this consisting of mice, chicks, meat, etc.

We placed a barrel in the large flight on 29th April taking care to place the entrance hole to face away from public eyes, and so give as much privacy to the pair as possible, should they make any attempt to nest.

On 5th May the birds started to mud up the hole in the barrel with some muddy soil provided by the keepers. The cock bird did most of this work, with a lot of interest and a little help from his mate. By 15th May the hole had become very small and excitement of all the staff mounted on the 17th May, when the hen had become completely sealed in, leaving only a slit for feeding purposes. It was interesting to note that excrement also was carefully forced out through this same hole. The nest must have been spotlessly clean, while the area outside was getting progressively dirty, but we of course left well alone.

At the end of May and beginning of June we began to get rather worried. Feeding habits fluctuated violently, in fact on some days little food at all

was taken. On 9th June we offered locusts which seemed to act as an appetizer and to our relief other food increased, but strangely enough mice and chicks, not so long ago a favourite food, were now refused completely; locusts and mince with a little fruit now appeared to be the order of the day.

On 28th June, 42 days after completion of mudding-up, a baby was thought to be heard squeaking and on the 29th definitely one chick was observed through the slit in the hole. Little fruit was now taken, but locusts, mice, young rats, cut meat and day-old chicks were eaten profusely, the food intake increasing steadily throughout August.

The cock bird was a very dutiful father. When given a fresh supply of locusts, it was his habit to immediately take each one up to his mate, seldom helping himself. In fact August proved a very busy month for him, for more and more food was demanded by the hen bird, who was constantly banging on the side of the barrel to attract attention.

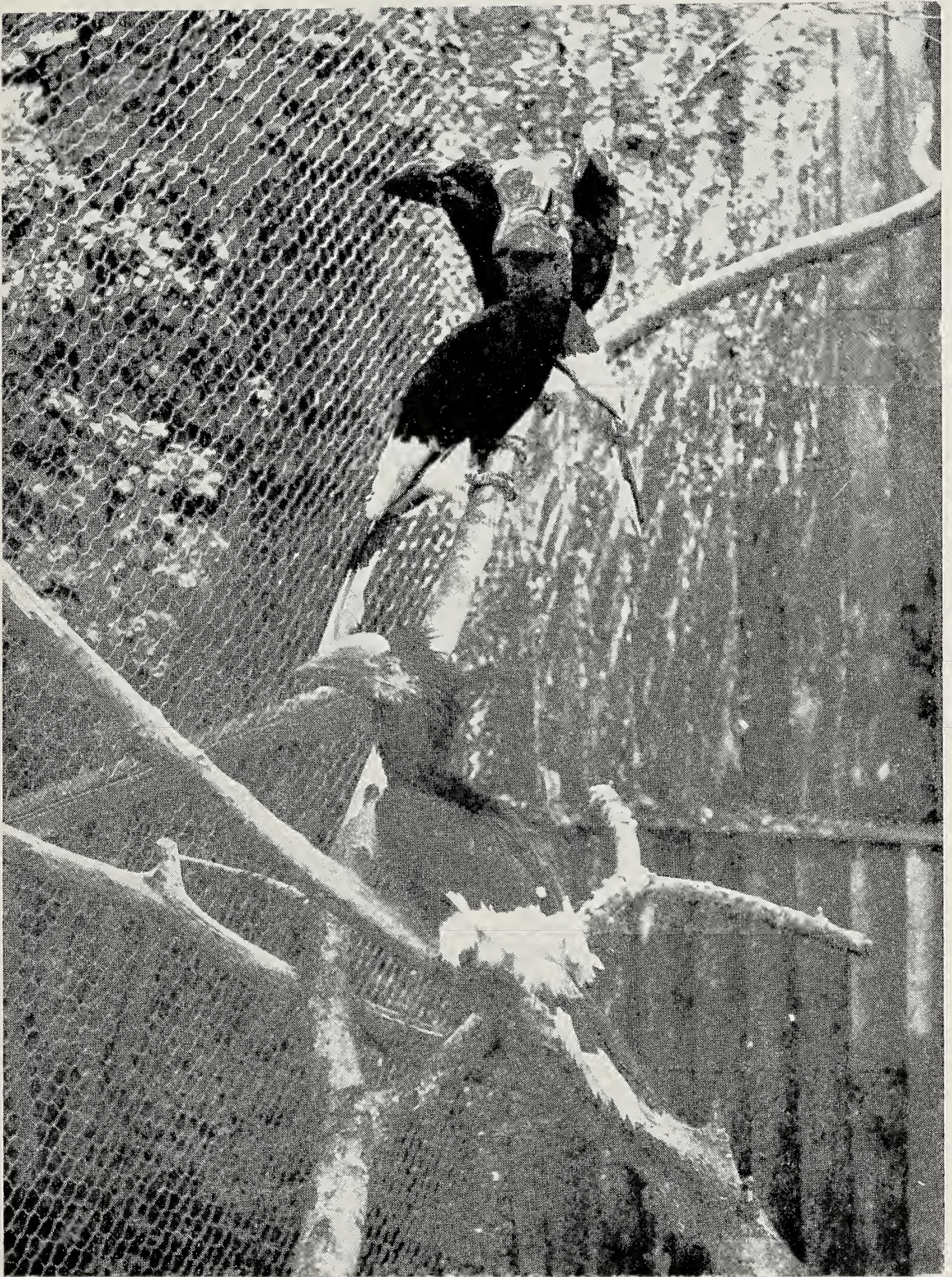
On 8th September, to the surprise of us all, during the morning three beaks were seen at the hole! Imagine the excitement of all at "Bird-world". Mum and two chicks were all demanding food from poor father.

The family had now been in the barrel home for four months. We thought perhaps it was time they were venturing out into the world. Should we give them a little help by making the hole a little larger? Or let Nature take its course? My husband sat down one evening and read all the literature he could find on hornbills, one article read that it was thought that some of the larger species did in fact stay in their nests as long as $4\frac{1}{2}$ months and so, as the pair had done so well without interference from us, we decided to leave well alone; which proved a wise decision. 124 days after the hen was first muddled-in the barrel, on 17th September at first light, two large knocks at the mud and out she stepped, quite calm and very clean in her new plumage, having gone through the moult while in the barrel.

The cock bird however was far from being calm, flying from one end of the flight to the other in great excitement, and to some extent, we felt, rather frightening the youngsters, who kept putting their heads out of the hole to see what all the fuss was about but not daring to join the parents. The first ventured out at 9.32 a.m., the second two hours later at 11.34 a.m., in rather an undignified manner, just missing the branch his mate had jumped to and falling like a stone to the ground. It did not take him many minutes to find his wings and join the rest of the family.

The young birds could fly very well as soon as they left the nest, perfect miniatures of their parents, with a spotlessly clean black and white plumage and about three-quarters grown. The nest that they had left was quite unsoiled and the birds never returned to it.

For the following five to six weeks the parent birds both fed the fast-growing babies. Now, of course, at three months they are quite self-supporting. The beaks are still much darker than the older birds and give the impression that they are both hen birds.



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[P. M. Harvey

Young Casqued Hornbill on the day it left the nest

The credit of this achievement is of course the birds, but we at "Birdworld" like to feel we helped a little by providing the situation and food necessary for this breeding in captivity.

As described above, the Casqued Hornbill, *Bycanistes subcylindricus*, has been bred at "Birdworld". It is believed this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Assistant Editor.

* * *

BREEDING THE CRIMSON-RUMPED OR SUNDEVALL'S WAXBILL AT CHESTER ZOO

(*Estrilda rhodopyga*)

By WILLIAM H. TIMMIS, Curator of Birds and Mammals

The Crimson-rumped or Sundevall's Waxbill is found from the Central Sudan to Eritrea, Abyssinia and western Somaliland where it is reported to be quite common locally in small parties, feeding on seeding grasses and it is said to be extremely tame.

The adult bird is about $3\frac{1}{2}$ inches in length, mainly brown above, slight greyish on the head and with crimson on the rump, edge of tail and along centre of folded wings; a broad crimson stripe runs through the eye; bill black; face, throat and foreneck white; breast and belly pale brownish-buff. Finely barred above and below. Two races are recognised: *E. r. rhodopyga*, which is rather paler, and *E. r. centralis*, this being rather darker below.

We have found it very difficult to distinguish the male from female, but it appears that the red through the eyes and on the rump is a much deeper colour and that the white on the throat is brighter and slightly wider in the adult male. Three adult Crimson-rumped Waxbills were purchased from Lady O. C. Baillie on 21st July 1964 and released into the Tropical House two weeks later. No breeding activity was observed until the summer of 1968 when a nest was found under a very thick layer of tropical creeper.

The nest was about two inches from the ground resting on a layer of dead leaves and grasses which we assumed had been collected by the breeding birds. The completed nest was quite large, I remember at the time being astonished at the nest size in relation to the size of the birds. The nest consisted of grass, feathers, thin shreds of banana leaves, which I feel must have been shredded by some of the larger birds in free flight and once discarded this was then collected by the Crimson-rumped Waxbills. Other materials used included hair, and stems of grass and millet.

Eggs were not seen, due to the fact that when the nest was found one of the birds was sitting and they continued to do so for 10 days, after which both birds were seen carrying food into the nest. Food was placed quite near to the nest area and consisted of soaked seeds, maggots dusted with Vionate, chopped mealworms and ants-eggs plus seeding and flowering grasses. I found that they also enjoyed fresh turves each day, also sprouted millet seed, barley, crushed hemp and dried flies. The crushed hemp was readily eaten, and the insects also, but not so ravenously, and it did not seem that insects were essential.

One young bird was seen being fed by one of the parents almost three weeks after the nest had been found. The parent birds at this stage were particularly timid and would not approach the nest while being watched. They were also very excitable, fanning their tails out wide and switching them from side to side, which was very attractive to watch. The young bird resembled the adults except that it had no eye stripe and the bill appeared brownish instead of black and had coloured nodules. It also had two tufts of downy feathers sticking straight up above the eyes and no tail feather at all. The young bird was observed on numerous occasions after leaving the nest and at about three months old it became very difficult to distinguish it from the adults at a distance.

The Crimson-rumped Waxbills bred again in 1971, this time rearing two young ones. The nest was almost 10 ft. up on a wide wall overlooking the Mountain Gorilla enclosure and was built among very thick vegetation.

This year 1972 they again nested in the same area overlooking the Gorillas and reared two young. I was able to watch this nest through binoculars and worked out the incubation period at around 12 to 14 days, the young leaving the nest at 25 days old and returning to the nest each night for almost a week. Both sexes helped with nest building and it appeared that the male did most of the construction in the earlier stages; almost all the larger pieces of nesting materials were found and carried to the nest site by the male. On three occasions I watched an adult male Red-billed Weaver (*Quelea quelea*) chase the male Crimson-rumped Waxbill while he was carrying nesting material, once actually taking a long stem of dried grass from his bill in flight and twice forcing him to land on the ground which resulted in the Waxbill dropping the grass; it was immediately picked up by the Red-billed Weaver who then flew to his small purse-shaped nest and started working on the large entrance at the side.

We never saw the male Waxbill feeding the female during incubation but once the eggs had hatched both sexes brooded and fed the young. Before feeding the young, the birds always settled on their customary perch and only after they had looked around and noticed nothing unusual did they fly to the nest. Once again it appeared that the male did more feeding than the female at least in the early stages. This may be because the female spent more time brooding and the male was responsible for

feeding the newly hatched chicks. Later, when the chicks were larger and did not need as much warmth, she then seemed to share the feeding almost equally as much as the male. One interesting point about the third nesting was the considerable amount of crushed eggshell and cuttlefish eaten by the breeding pair both during incubation and in the rearing stages.

As described above, the Crimson-rumped or Sundevall's Waxbill (*Estrilda rhodopgys*) was bred at Chester Zoo in 1968, 1971 and 1972. It is believed that this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Hon. Assistant Editor.

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OBSERVATIONS ON HATCHING NORTH AFRICAN GROUND HORNBILL AT THE SAN DIEGO WILD ANIMAL PARK

By JOHN R. FAIRFIELD

(San Diego Wild Animal Park, California, U.S.A.)

Africa hosts two species of large terrestrial hornbills, the North African or Abyssinian Ground Hornbill (*Bucorvus abyssinicus*), and the Southern species (*Bucorvus cafer*). Both species are black in colour with white primary feathers. The North African ground hornbill inhabits the savannah land south of the Sahara from Senegal and Sierra Leone in the west, across Africa through Niger, Chad, Sudan; and Ethiopia, Somali Republic, Uganda and central Kenya. The southern species is found living south of the Equator.

Both the northern and southern species have a huge black bill with patches of red at the base. The area of skin surrounding the eye is bare, blue in the northern species but red in the southern form. The wattle on the throat is inflatable, both red and blue in the male. The female is somewhat smaller in stature with the area around the eye and the wattle being completely blue. The casque on the head is most unusual in that it is open in front, and gives the appearance of being broken most of the time. The presence of the large casque is an excellent distinguishing feature of the North African form while it is hardly noticeable in the southern species. The diet of both species is varied to include lizards, snakes, large insects, small birds and mammals. Much of their lives is

spent on the ground foraging the vegetation for food. They are capable of flight and their roosting habits are in trees or low bushes in which they spend their nights.

At the time of this writing the San Diego Wild Animal Park has one pair of North African ground hornbills in the 125-acre East African exhibit. The female "Susie" was received at the San Diego Zoological Garden on 20th September 1961 from Tilburg, and the male "Charlie" was received at the Zoo on 8th August 1951 from Rotterdam. Both birds were thought to be adults on arrival. The female was received at the San Diego Wild Animal Park on 14th September 1970 and the male was received 24th February 1971. They were introduced to the same area and were immediately compatible. The individual temperaments of the birds are almost exactly opposite, with Charlie being a friendly and almost courageous bird while Susie is of a timid, shy and much reserved nature.

On 20th May 1972 Charlie was observed attempting to feed Susie a rodent. She accepted the mouse and consumed it after a brief period of carrying it around in her bill. At every observation for the next few days both Charlie and Susie were carrying leaves and twigs to an 18-inch diameter drainage pipe situated on the extreme eastern edge of the exhibit. The female Susie would place the material in the drainage pipe and appear to stand guard at the entrance. The week of 7th June 1972 was one of inclement weather at the Wild Animal Park. The drainage pipe which the hornbills had taken over was once again being used and Charlie and Susie left the area. The next day they were observed on the opposite side of the exhibit and on the moat line which is made of earth. They remained in this area almost constantly with the exception of Charlie who would migrate to the original food station across the exhibit and return to Susie with food.

On 12th June 1972 Charlie did not come for food. A visual examination of the moat line showed why. Both he and Susie were laboriously digging with their bills a cave in the earthen moat wall and a hole was started about 24 inches above ground level. Once the cave was large enough for them to enter they incorporated the use of their feet as well. Since it was obvious that neither he nor Susie were going to leave their labour for food a new feeding station and a new method of feeding was established. Their diet which consists of day-old chicks, rodents and small amount of raw meat chunks was simply placed from afar near the nesting area. The construction of the cave went on daily until the morning of 23rd June 1972. Charlie was seen carrying leaves and twigs, and Susie was seen placing the material in the nest.

On 26th June 1972 mating was observed. It was witnessed only one time and took place about 200 ft. below the nest area. It was in typical avian fashion with very little vocalization. Charlie would emit low booming calls and walk around Susie with his wings partially extended and his feathers ruffled. He would thump his bill on the ground while

booming. The complete act took about 30 minutes with the actual mounting being the terminating point.

On 29th June 1972 both birds were observed carrying nesting material into their cave, with Charlie spending more time inside than out. This behaviour continued until 12th July 1972 when Susie went inside the nest and remained. Charlie became more aggressive and protective of the entire area surrounding the cave.

The cave is about 4 to 4½ ft. in depth with a slight curvature to the left. The entrance hole is much smaller being about 18 in. in diameter. The cave opens east and is constructed so that no direct sunlight ever really enters more than a few inches into the entrance of the nest itself. The major area of the floor of the cave has been covered with leaves and twigs in which Susie sits facing the entrance. The earth that was removed during the actual cave construction has intermingled with rhino dung so that a ramp has been created from the ground level to the cave entrance.

On 16th July 1972 one off-white egg was observed partially exposed from under the feathers of Susie's breast. Since she sits facing the opening, the egg was rather easily seen. On 17th July 1972, a second egg was observed under Susie. The opening to the nest remained open and the male continued to feed the female. She did not leave the nest for food or water.

On 22nd August 1972 movement was observed in the nest and instead of the two eggs, we observed one chick and one off-white egg. The chick was hatched naked with eyes closed. The chick's bill is rather enormous for the body size, being very dark grey (almost black in colour) with a large egg-tooth in place on the tip. The dark pink skin (almost purple) covering the body of the chick was textured and closely resembled a layer of fine grey-white down when first observed. The size of the egg and the chick was close to that of the domestic turkey (*Meleagris gallapavo*).

The second egg was fertile but was broken open by the female. On 30th August 1972 the second chick, almost full-term, was observed dead just inside the nest.

The hatching of the North African Ground Hornbill at the San Diego Wild Animal Park is the second hatching of this rare species ever recorded in captivity, the first being in Bristol in 1971. This is the first hatching recorded in the Western Hemisphere.

BREEDING ROSS'S TOURACO

(Musophaga rossae)

By NEWTON R. STEEL (Stoke Fleming, S. Devon, England)

In October 1968 I was privileged to be the guest of the East African Guernsey Breeders' Association, during which time I not only judged cattle at the Nairobi Show, but word had got round that I was exceptionally interested in birds. Through this, all my hosts and hostesses on the ten different farms at which I stayed during this time, went out of their way to show me as much as possible of the bird and wild life of Kenya. It was whilst staying on a farm at Kitale that I visited a lady who had two pairs of Ross's Touraco—one of which that year had produced a youngster which died at some ten days old. I was so attracted by these birds that I tried hard to buy a pair from her, without success. However I was going to visit Mr. David Roberts at Lake Baringo so thought I might be able to obtain them there. There were in fact none available at the time but he agreed the price and promised to send me a young pair as soon as they had been hand-reared.

This was subsequently done and one day whilst engaged judging a Dairy Herds competition in the Surrey area, I received a telegram to say that some birds were awaiting me at London Airport. The kind lady who was acting as my chauffeur for this judging engagement, offered to take me to London Airport to collect them, which we did on this June afternoon. They arrived each in its own separate compartment with feeding instructions pasted to the lid and when I got home and unpacked them, one—which subsequently turned out to be the male—was in excellent condition, the other looked somewhat dirty and tatty and gave me some concern for a week or two.

Mealworms were an irresistible temptation and with these in limited numbers, together with their softbill mixture and soft fruit and *ad lib* bathing facilities, they did extremely well in one of my calving boxes on the farm under infra-red lamps which were thermostatically controlled to maintain 65°F, then as the summer warmed up and they became better feathered, this was gradually reduced. They were given an outside flight which they could use in the daytime only, and here they remained until I moved to Devonshire in November 1967, where they were housed for their inside quarters in the cool end of a heated greenhouse, with an exit to a long 10 ft. flight raised 2 ft. off the ground on wire netting.

They seemed very contented and pleased with their new home which during the winter was thermostatically controlled to between 45°F and 50°F. They go into a moult in the early part of the spring each year and at the end of one of these moults, one June day in 1968, I returned from the garden to find the hen very severely beaten up about the head, and

down in a corner. So severely was she damaged that a scab grew right over her head and eyes, thus preventing her from seeing to feed and even today she still has a naked patch at the back of her neck and one blind eye, which she unfortunately did herself with one of her long claws when scratching the irritating scab. I had to force feed her for some ten days to a fortnight and of course during this time she became very tame. Her head and eyes were dressed with ointment twice a day and in due course the scab came off and she re-grew her carmine crest. It was only then that I realised she was blind in one eye. During this period she was confined to a segregated section of the indoor aviary so that she should not fret and here she lived until the moult of 1971 when I thought it was really time that I tried to get them together again.

This I did in short periods of re-introduction when I was close by for an hour or two. One day to my delight I saw them feeding one another. I hurriedly spent a whole afternoon erecting a large tree log in the far end of the flight, up against a south facing wall, hoping that this might be a suitable home for them but no, they took no notice of it whatsoever but preferred to carry very stupid pieces of stick on to some dangerously insecure branches in the greenhouse. I endeavoured to help them by putting some flat, dry laurel branches and leaves horizontally, but for all their industrious stick carrying, everything fell down to the ground again. I then wove in a piece of wire netting upon which I thought they could lay their sticks more securely, when one day to my horror I found a broken egg on the floor. It had rolled off this very insecure platform. This was 16th June 1971.

My next attempt was to commandeer the only suitable shopping basket and promptly remove the bottom of it, leaving a rim of about an inch all round. The bottoms of shopping baskets, as you may know, are more often convex than concave, so I had to make my nest-basket concave and this was done by pressing it into an earthenware pigeon nest pan, putting in the middle of it some extremely heavy bricks and filling the pan with boiling water. When it had cooled off I found the canes had set in a concave fashion and I then wired this on to the top of the wire-netting. An old green sunblind protects the nest from direct rays of the sun or cold radiation from the glass. The nest is 6 ft. from the floor. Every time I approached the nesting-site to give any help at all, I was attacked by both birds so the only safe means was to keep them out in the flight while I performed the house building. This complete, I replaced the broken egg with a similar size bantam egg.

18th June 1971

They took to it and the following day a second egg was laid and then a third, so I removed the bantam's egg. This was the only occasion the clutch was more than two. Not having any idea how long they would brood, I left well alone, but on the 7th July one egg was missing. No

sign of it anywhere. I felt sure it had been eaten. After this they were less and less concerned, although they continued to sit for a day or two. I subsequently examined the second egg only to find it infertile so removed it.

25th July

Another egg appeared and a second one on the 27th.

27th July

These were again religiously incubated by the cock bird sitting from about 10 o'clock during the day and the hen bird from tea-time until the middle of the following morning. The eggs are almost completely round, rather like those of an owl and 43 mm. \times 36 mm. with no small end.

They sat continuously for four weeks. When I removed the two eggs I found that one had a well-formed but decomposing chick in it. The head was well-formed and eyes visible, and there were black feathers down the neck and on the shoulders so it had obviously died just prior to hatching. With this I decided it was quite late enough, so removed the nest for the rest of the year. They went into their usual moult at the end of February/March 1972 and at the end of March I replaced the basket nest.

9th and 11th April 1972

This they were delighted to see and on the 9th April the first egg was laid, the second on the 11th April. They shared the incubation period again for nearly four weeks but again both eggs proved infertile.

19th May

Again they went to nest on the 19th May, this time not sitting quite so well as in the past, and after three weeks I tested the eggs and found them both infertile so I removed them.

28th and 30th June

Once again on the 28th June another egg appeared and a second on the 30th June. This time they sat well and on the 23rd July, just 24 days after, the second egg hatched and the little black chick, looking almost exactly like a young Moorhen, was sitting with its head up in the nest. But this was found dead on the floor at four days old. I removed the other egg which was infertile. This was a great disappointment. During this time I had been feeding them all their usual cut-up mixed fruit, together with an insectivorous mixture and mealworms, but obviously it was not sufficient.

12th and 14th August, and 8th September

However to my delight they went to nest again, the first egg was laid on the 12th August and the second on the 14th August. The first egg

was hatched on the 8th September. I left the second egg in the nest for support.

During the incubation period I had started to feed the parents with an occasional sop of bread and milk. This they became very fond of and when the chick hatched, they had a regular feed out of my hand of bread and milk twice a day, ten or a dozen mealworms three times a day, and what I believe has been the main reason for success in rearing this chick, in place of water I substituted nectar feed. Other than their bath out in the flight, they have never been offered water up to the present time. They consume a cupfull of nectar a day, and the chick, now six weeks old, has been seen down at it. Mealworms were increased from 12-15 to 20-25 and they are now taking 100 a day. I have no doubt they would take more but I feel that these, with the bread and milk and nectar, should be adequate.

They have been consuming in the last two or three weeks the equivalent of half a slice of bread cut at an inch thick, soaked with milk overnight and sugar sprinkled on the top and, in addition to this, a very concentrated powder with a very high protein content. Half a teaspoonful of this has been sprinkled on both feeds of bread and milk, as well as on the mealworms. Gentles have been offered, but are not readily taken, except when fed before mealworms and if they are very clean and lively, then the odd one seems to be eaten. Feeding is by regurgitation. Not as with pigeons where the young put their beaks into the parents, but by the young opening a large gape and its parent dribbling food into the open mouth. Far less of the fruit and insectivorous mixture is taken. In fact for the first week or two hardly any, other than orange and grapes. Even pear did not seem to be appreciated.

At the time of writing on the 26th October, the chick has been out and about for nearly a fortnight. It was interesting to note that at first the chick was found down on the floor, where it remained for four days despite my thinking it was kind to return it to the nest, but after four days it returned to the nest of its own accord and continued to be brooded there at night.

Since it came out of the nest, I have endeavoured to maintain a temperature of 60°F by means of an electric radiator. The chick is now well feathered and the blue sheen shows on the wings and tail, but as yet the lovely carmine of the secondaries is not visible. The bill and wattle and ceres are still quite black. It will be interesting to see how long before they change colour. It is now about the size of a pigeon.

For those who have not been so fortunate as to know that they have a pair, the difference between the male and female is that in the male, the caque, or wattle, is very slightly concave and when really fit has a little red mark in the centre, whilst that of the female is convex (i.e. Roman-nosed) and has no red marking. One of the interesting features of the birds is that they very much resent any change in one's appearance.

Normally I never wear a hat or glasses when I am feeding them but should I inadvertently do so, I am attacked viciously. Apart from this they are most friendly, will take mealworms or bread and milk out of my hand, and always seem pleased to see me. I believe it is advisable, particularly during the hot summer, to let them have a bath available during incubation and should this be done, I think it is essential that it is there all the time so that each parent may bathe when it pleases, because on one occasion when I had withheld the bath for a period, both parents came off the nest and got thoroughly soaked and then sat in the sun drying themselves. As with so many birds, I find that they only bathe in fresh, clean water—in other words they will not go into a dirty bath.

The floor covering of the inside aviary is coarse sand, which I feel advisable as it is easily cleaned out, they being rather messy birds underneath their perch. For safety's sake I keep them off the earth. Visitors are something which I never let them have during the incubation period because they are much too agitated and omit their delightful liquid warbling cry. I do feel that it is inadvisable to encourage their nesting outside, especially in view of the length of time they sit and the lateness in the year for a chick to be out.

29th October

Glorious sunny day; father taught baby to have a bath. Incidentally three days ago he turned on the hen and scalped her unmercifully; she has been removed for treatment and is recovering. He maintains close watch over the chick which now feeds itself regularly.

As described above Ross's Touraco *Musophaga rossae* has been bred by Newton R. Steel. It is believed this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Assistant Editor.

* * *

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Since its beginnings almost 80 years ago, our Magazine has been famous for its beautiful colour plates, depicting rare and interesting birds, either from paintings or photographs of live specimens.

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Mail sent to Sladmore Farm, High Wycombe, will still be received for the time being but may be delayed in reaching this office.

In response to enquiries from American Members, we have established that the cost of sending the AVICULTURAL MAGAZINE to the United States by *airmail* is \$5.00 a year extra at the current rate of exchange. If you would like your Magazine sent to you by air, please write to me enclosing your remittance. We will be pleased to quote a price for airmail to other parts of the world, on request.

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THE AVICULTURAL SOCIETY

Founded 1894

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View from Walkway Rain forest Aviary, Taronga Zoological Park, Australia



Copyright] Distant view of Rainforest Aviary over new waterfowl ponds [K. Muller

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MARCH-APRIL 1973

NEW WALKTHROUGH RAINFOREST AVIARY AT THE TARONGA ZOOLOGICAL PARK

By KERRY A. MULLER (Curator of Birds, Taronga Zoological Park,
Sydney, N.S.W., Australia)

The concept of large walkthrough aviaries is certainly not new in zoos, and the majority of first-class zoos in Europe and America have exhibited such aviaries for at least the last decade, some being constructed at the turn of the century.

The Colin Mackenzie Sanctuary in Healsville, Victoria, was the first Australian Zoo to build a large walkthrough aviary. This houses a breeding pair of Superb Lyrebirds. They have recently completed a second similar aviary and a large bird-of-prey aviary.

On 3rd February 1972 the New Walkthrough Rainforest Aviary was opened at the Taronga Zoo. In dimensions it stands 122 ft. long, 70 ft. wide and 60 ft. high, being oval in design.

Architecturally it is unique, the entire aviary being supported by two inclined steel parabolic arches. These arches are further supported by interlacing cables of 8 mm. diameter, stainless steel wire ropes and 8 mm. diameter high tensile stainless steel rods, strung to form a grid. Both the arches and cables are bolted into a concrete perimeter foundation. The aviary cover is of 25 mm. (1 in.) by 12 mm. ($\frac{1}{2}$ in.) galvanized weld-mesh, tightly secured to the cables and the cement foundation. This size mesh contains all bird species, including Malurus wrens, and prohibits the entry of pests such as sparrows, starlings and rats. A guiding principle in the design of the aviary was to create an enclosed space with no acute angles, no crossbeams or upright supports, either inside or out. The entire space is available for unobstructed flight (in this we are fortunate in not having to consider problems of snow or ice loads.) Entry and exit for the public is permitted at either end by a revolving door, consisting of three panels set at 120° and permitting the access of strollers (or perambulators) into the aviary. The vertical edges of these panels are lined with heavy rubber strips to prevent escape of birds and injuries to the visitors.

Within the aviary visitors are confined to a wide natural wood walkway. Wherever possible this is raised above the ground, thus preventing visitors from leaving the walkway and allowing birds access under

the walkway from one area to another. The area under the walkway is heavily planted, and provides additional security and nesting areas for the birds. In areas where the walkway approaches ground an inconspicuous barrier of sharp upturned tree-roots has been provided, upon which vines and epiphytes are growing. This device has proved very satisfactory in confining visitors to the walkway and it has not been necessary, as in many zoos, to employ a keeper or guard on patrol during visiting hours. No visitors have yet been observed off the walkway.

Landscaping the aviary in a simulated rainforest was a major undertaking. The site has an undulating slope, in some areas exceeding 45°, with a substrate of sandstone, in some areas forming attractive outcropping shelves. Initially all old soil, rubble and vegetation were removed from the site, retaining only an Umbrella Tree (*Brassaia*) and a badly cropped Paperbark (*Melaleuca*). New soil rich in leaf mould was added, in some areas contained by low stone retaining walls. Trees for perching were cut and set in concrete filled holes. To provide a composite rainforest effect similar to those found in eastern Australia, the following indigenous species were used in landscaping:—

For canopy and secondary cover: Tree Ferns (*Cyathea australis* and *Dicksonia antarctica*), Port Jackson Fig (*Ficus rubiginosa*), Cabbage Tree Palm (*Livistona australis*), Morton Bay Fig (*Ficus macrophylla*), Weeping Fig (*Ficus benjaminii*), Sydney Red Gum (*Angophora costata*), Grey Gum (*Eucalyptus punctata*), Bangalay Gum (*Eucalyptus botryoides*), Native Frangipanni (*Hymenosporum flavum*), Wattle (*Acacia longifolia*), Brush-box (*Tristania conferta*), Christmas Bush (*Ceratopetalum gummiiferum*), Lillypilly (*Acmena smithii*), Umbrella Tree (*Brassaia actinophylla*).

For ground cover: Harsh Ground Fern (*Hypolepis muelleri*), Rock Felt Fern (*Pyrrosia rupestris*), Fishbone Fern (*Nephrolepis cordifolia*), Common Maidenhair Fern (*Adiantum aethiopicum*), Austral Bracken Fern (*Pteridium esculentum*), Coral Fern (*Gleichenia rupestris*), Hares Foot Fern (*Devallia* sp.), Rock Orchid (*Dendrobium speciosum* and *Liparis reflexa*), Creeping Fig (*Ficus pumila*), Native Grasses.

Several trips were made to rainforests to collect epiphytes and lianas. Epiphytes exhibited are:—Staghorn Fern (*Platycerium grande*), Elkhorn Fern (*Platycerium bifurcatum alcidorne*), Birds-nest-fern (*Asplenium nidus*), Climbing Fern (*Dictyria brownii*), And some native orchids.

Transplanting of lianas was not successful, probably due to lack of sufficient shade cover. This will be attempted again when a canopy is established.

The majority of native trees were available from nurseries only in sizes up to 3 ft. in height. To gain additional initial plant cover, the following exotic "nurse" plants were added, many of which will be removed when cover increases: Giant Bird-of-Paradise (*Strelitzia nicolai*), Indian Giant Bamboo (*Bambusa arundinacea*), Large-leaved Privet (*Ligustrum lucidum*), Elephant Ear (*Colocasia antigurum*), Giant Honeysuckle (*Lonicera*

hildebrandiana), Cape Honeysuckle (*Tecoma capensis*), Asparagus Fern (*Asparagus sprengeri*), Wandering Jew (*Tradescantia fluminensis*), Begonias and Bromeliads.

A series of small pools and connected streams were established in the aviary, often adjacent to the walkway. Contours were shaped in the soil and lined with butyl rubber. Sand and river gravel were added to cover the rubber and give a natural appearance, and the pools planted with native lillies and rushes. Small fish, amphibians and tortoises were then added to complete the illusion of naturalness (much to the delight of our Kingfishers).

Water is a major necessity of any rainforest, and this is provided by four oscillating sprinklers located inconspicuously on the steel arches above the vegetation. On the ground a series of mist-producing heads are connected to a copper water line buried in the soil. To water the exhibit a keeper need only turn on a series of valves and return to other duties. On hot days the overhead sprinklers are often turned on, to the mutual enjoyment of birds and visitors.

To prevent erosion and to provide a natural substrate, leafmould and dry leaves were used to cover the forest floor. These rapidly decomposed and provide food for insects and earthworms, which are in turn consumed by the birds, especially the Lyrebirds.

Food for the wide variety of birds is provided in several feeding stations, and changed once or twice daily. Stainless steel pans are placed in moveable holders, both at ground level and above ground dependent on the birds' feeding habits. These holders are fitted with circular transparent perspex plastic domes, placed 12 ins. above the pan. These keep all rain and water out of the feed but are unobtrusive in appearance. For nectar feeders several bottles are provided on holders in trees throughout the cage. For fruit-eater birds several dead perches have a series of stainless steel headless nails imbedded in them, and pieces of apple, orange, banana and papaya are impaled on them daily and old fruit removed.

In stocking the new aviary, emphasis was placed on Australasian species inhabiting rainforest habitats. One reason for this is that the area of the zoo in which the aviary is built is dedicated to native fauna and flora. Another reason is that importation of any birds into Australia has been forbidden by law since 1948, and exotic bird species are difficult (or impossible) to obtain.

Labels were made identifying the birds presented, and defining the relationship and adaptations of different families of birds to particular ecological niches in a rainforest. It is our eventual aim to represent as many families as possible in the aviary.

The following species are presently exhibited in the rainforest aviary: Banded Landrail (*Rallus philippensis*), Torres Strait Pigeon (*Ducula spilorrhoa*), Top-knot Pigeon (*Lopholaimus antarcticus*), White-headed Pigeon (*Columba norfolciensis*), Luzon Bleeding-heart Pigeon (*Gallicolumba*

luzonica), White-breasted Ground Dove (*Gallicolumba jobiensis*), Nicobar Pigeon, (*Caloenas nicobarica*), Victoria Crowned Pigeon (*Goura victoriae*), Sacred Kingfisher (*Halcyon sanctus*), Superb Lyrebird (*Menura superba*), Ground Thrush (*Zoothera dauma*), White-browed Scrub Wren (*Sericornis frontalis*), Yellow-throated Scrub Wren (*Sericornis lathamii*), Superb Blue Wren (*Malurus cyaneus*), Willie Wagtail (*Rhipidura leucophrys*), Yellow Robin (*Eopsaltria australis*), Golden Whistler (*Pachycephala pectoralis*), Grey Shrike Thrush (*Colluricincla harmonica*), Eastern Whipbird (*Psophodes olivaceus*), Eastern Silvereye (*Zosterops lateralis*), Yellow-faced Honeyeater (*Meliphaga chrysops*), Yellow-tufted Honeyeater (*Meliphaga melanops*), Lewin Honeyeater (*Meliphaga lewini*), White-naped Honeyeater (*Melithreptus lunatus*), Eastern Spinebill (*Acanthorhynchus tenuirostris*), White-cheeked Honeyeater (*Phylidonyris niger*), Bell-miner (*Manorina melanophrys*), Noisy Friar-bird (*Philemon corniculatus*), Olive-backed Oriole (*Oriolus sagittatus*), Southern Figbird (*Sphecotheres vielloti*), Regent Bowerbird (*Sericulus chrysocephalus*), Satin Bowerbird (*Ptilonorhynchus violaceus*), Green Catbird (*Ailuroedus crassirostris*), Siamese Fireback Pheasant (*Lophura diardi*).

Several of these have nested successfully in the first year of operation. The Satin Bowerbird has a fine bower within three feet of the public walkway. Efforts were made to avoid initial overstocking, allowing for later plant growth to provide additional cover. Within the next few months pittas, treecreepers, sunbirds, log-runners, cuckoos, parrot-finches and small lorikeets will be added to the aviary.

One of the greatest of all aviculturists and ornithologists, Jean Delacour, once wrote "The principle of a walk-in cage is excellent, and I can claim to be the sponsor of such aviaries in America, where they have proved highly satisfactory. But its very principle is that the cage itself is not obvious, so that the visitor who is inside has as much as possible the illusion of walking among free birds. The frame of the aviary must not only be simple and inconspicuous, but also made invisible by trees and creepers. Even its approach should be so planted on the outside that one is not aware that there is a cage at all."

We feel that in design and landscaping our new rainforest aviary meets these criteria admirably.

REFERENCE

- DELACOUR, DR. J. 1961. Cage and Aviary Design. *Avicult. Mag.*, Vol. 67, No. 3, p. 107.

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BRIEF NOTES ON DISPLAY AND POSTURES OF SOME LARGER FRUIT PIGEONS IN CAPTIVITY

By C. J. O. HARRISON (Berkhamsted, Herts., England)

On two recent visits to the London Zoo on mild, dull December days I was surprised at the activity of some of the fruit pigeons. This included a display apparently not described previously, and I have therefore published these notes. The accompanying sketches are reconstructions at a later date based on hasty scrawls on the backs of envelopes or any paper that came to hand in my pockets. They are not accurate as regards detail but may help to give a general impression of the postures.

The display was that of the Grey-necked Fruit Pigeon, *Ducula caroli*. There were two birds, which Derek Goodwin tells me are two males, about the size of domestic pigeons but more stoutly built in typical fruit pigeon fashion. They are mainly grey with dark spots on the wings and a greenish tail. The upper breast is pale silvery-grey and the lower breast a darker shade of grey, the two separated by a transverse line and giving an illusion of shadow on a sunlit bird. Towards the sides of the breast a white line separating the two areas is visible. The belly and under tail coverts are a dark purplish-brown.

The displaying bird drew itself upright on the perch, very tall and thin, and blew out its chest as a two-tone grey balloon, rather in the fashion of a pouter pigeon. At the same time it extended its neck forward and bowed the head until the neck rested on top of the inflated breast with the head pressed down against the upper breast and the bill pressed into the feathers (fig. 1). The legs were stretched and the tail pointed downwards.

In this posture it uttered a series of low-pitched "oomp" notes, about eleven notes in rapid succession, beginning emphatically and becoming more rapid and lower in pitch, and dying away. I can only describe the general tone as similar to that heard when air rapidly bubbles out of a submerged pint milk-bottle—a sound most washers-up may recall. The bird repeated the performance twice.

It then turned slightly towards its companion who stood in an upright, alert posture nearly. The displaying bird retained its very rigid upright stance with lowered head, but by flexing its legs slightly performed a series of vigorous upward jerks, very like those occurring in the display of some estrildines. Having done six or seven of these it relaxed a little, raising its head and uttering a small harsh note; after which it returned to a more normal posture. The very upright posture was of interest because this species is one with a conspicuously patterned underside.



FIG. 1

On the same visits I watched a Mountain Imperial Pigeon, *Ducula badia*, perform calling and nest-calling in a nearby aviary. The commencement of this was indicated by the bird extending head and neck forwards and upwards with the feathers of the head slightly fluffed and the throat partly inflated (fig. 2). This was followed by an arching forwards and downwards of head and neck accompanied by a puffing-out of the breast, resulting in a hunched posture with the head pressed against the front of a swollen breast and the bill almost buried in the feathers fig. 3). In this posture

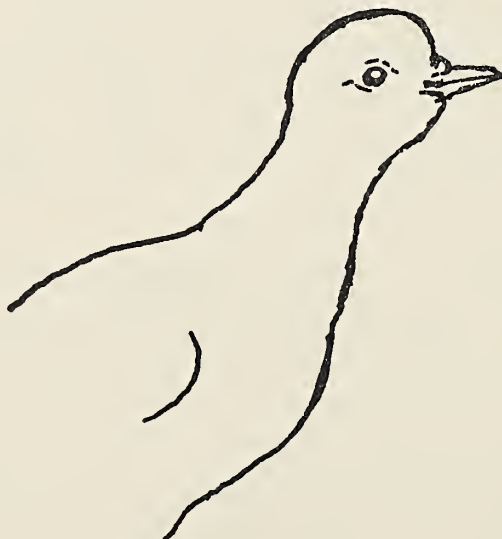


FIG. 2

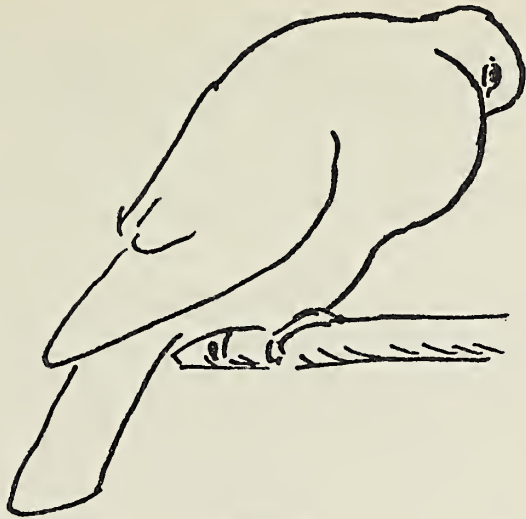


FIG. 3

the bird uttered four well-spaced, deep notes, the first two rather short and more rapid, the second pair longer and almost disyllabic "wook-wook, urwook, urwook". This was immediately followed by an abrupt upward swing of the head back to a more normal position above the back terminating in a slight backward pressing of the head and outward thrust of the breast. The same pattern was witnessed several times.

This individual was also seen nest-calling on two different occasions. It squatted on top of a closely-clipped privet hedge. Its tail was not noticeably raised and there was no marked wing-twitching, only an occasionally slight tremor of the wings. Small twigs were picked up and placed to either side by the bird. Periodically it would call. There was the same arching of the neck and pressing of the deeply-lowered head against the inflated breast. The call was only two monosyllabic notes "wook, wook" and then the head was abruptly raised again in typical fashion.

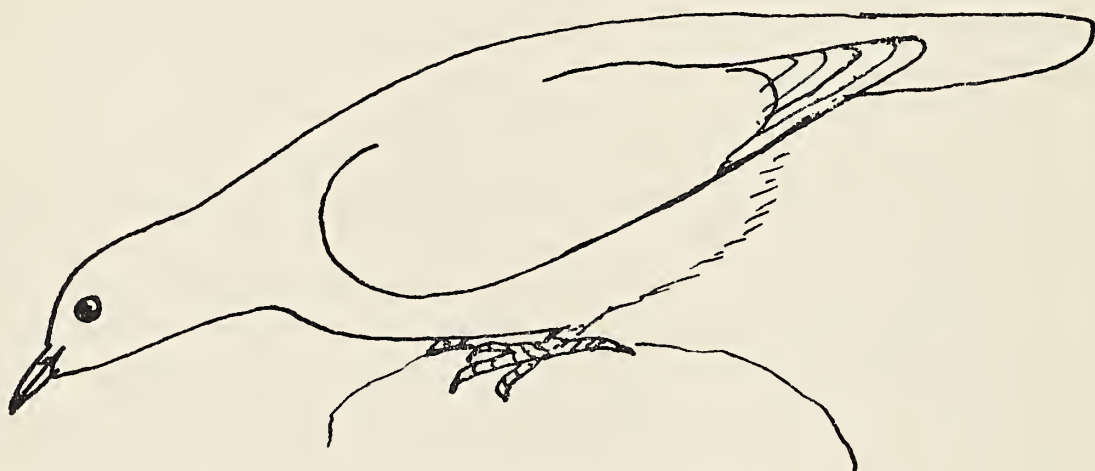
I had also seen this type of call with deeply-lowered head from an Australian Pied Imperial Pigeon, *Ducula spilorrhoa*, at Amsterdam Zoo in 1970. In this case the posture of the calling bird was almost horizontal. The bird squatted on a perch, lowered its head to the front of the breast with bill pressed against the feathers. It uttered what I noted at the time as a deep, hollow "crool, coo-rool". It also gave a briefer "kut-crool" note.

In this last species I noted one individual standing on a possible nest-site, tilted forwards with tail straight up and breast and bill almost touching the site. Its wings were rhythmically quivering but I could not hear a call at the time. I also noted one bird threatening another by moving in short hops towards it with head low and neck extended forwards, and uttering an abrupt "check" or "chuck" note, loud and nasal, and more like that of a rail than a pigeon. This last note appears similar to that recorded by Derek Goodwin (*Pigeons and Doves of the world*, 1967; p. 420) for the Indonesian Pied Imperial Pigeon, *D. bicolor*.

MATING CEREMONY OF THE MOUNTAIN IMPERIAL PIGEON

By DEREK GOODWIN (London, England)

On January 3 1973, I observed copulation in a pair of Mountain Imperial Pigeons, *Ducula badia*, at the London Zoo. Although this was seen only once it seems worth publishing here, partly so that it can form an appendage to Dr. Harrison's observations on *Ducula* species, and partly because I know of no other observation on any species of the *Ducula/Ptilinopus* group. The copulation ceremonials of pigeon species, although sometimes variable in minor details, are usually species-specific (Goodwin 1956, 1970) so that even if only one such has been seen it is highly likely to fall within the species' normal repertoire and quite likely to be entirely typical.

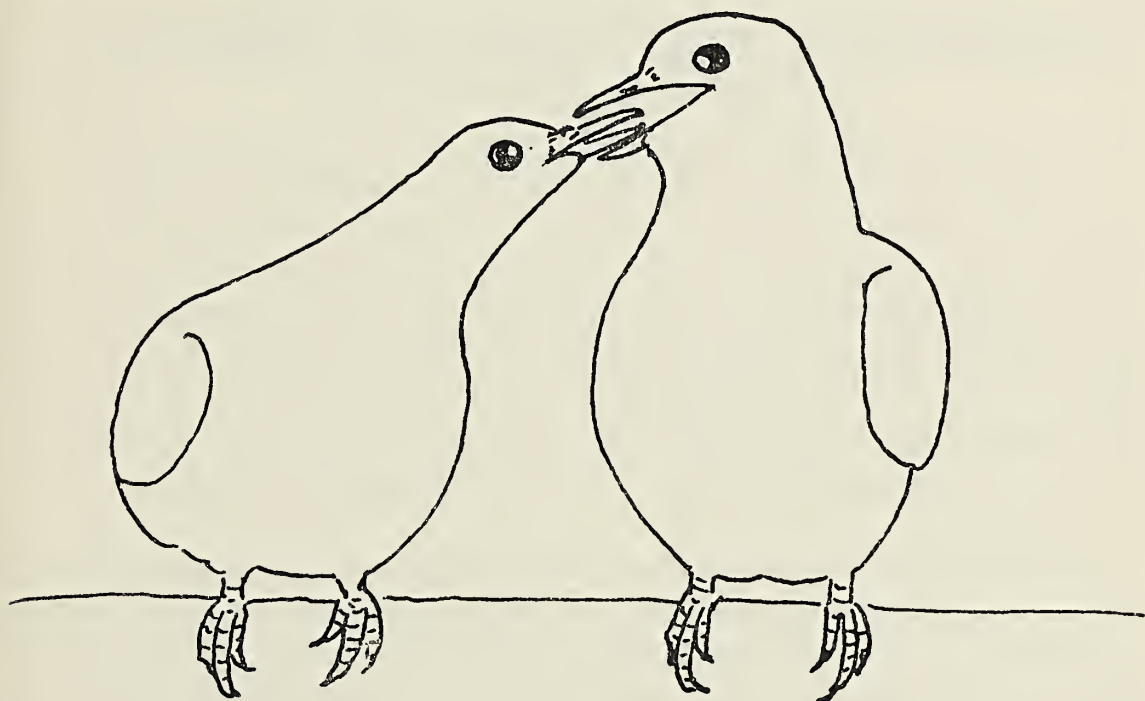


Mountain Imperial Pigeon. Female soliciting.

Shortly after cooing (see Harrison preceding article pp. 39–41) the male flew down, sighted on a low perch and at once displacement-preened at the side of his breast. The female, on seeing this, immediately flew down also and alighted about two feet from him. As she did so he displacement-preened once behind his wing. She sidled a little towards him, then adopted a soliciting posture which differed from that of other pigeons known to me in that her neck was elongated and curved slightly downwards. For some moments the male stood beside her in an indecisive manner. Then he raised his head, slightly swelled out his neck (inflation or plumage erection?), then mounted the female. He remained for some time, perhaps only half a minute but it seemed longer, quiescent on her back. Once during this period he head flicked, usually a gesture of irritation or repulsion (Goodwin 1956 b). Then he began simultaneously to coo and

to manoeuvre backwards to copulate. I had the impression that the actual cloacal contact coincided with the end of the cooing phrase, and the backward movement of the head as described by Harrison.

The male dismounted onto the perch at the same side of the female from which he had previously mounted. He lifted his head high, the female turned eagerly towards him and reached up with her bill. The male offered his bill, opening his gape widely. The female inserted her bill and with it inside the male's rapidly opened and shut her bill with a vibrating movement of the head. The male did the same (except that his bill was, perforce, widely open at the time) with his bill. There was no passage of food or other matter between them. They separated, then immediately repeated this billing, after which the mating ceremony appeared to be at an end.



Mountain Imperial Pigeon. Post-copulatory billing.

If this instance was typical its most noticeable difference from that of such other pigeons whose mating ceremonies have been described was the occurrence of billing after instead of before copulation. The rapid opening and shutting of the mandibles is similar to what I have seen from the African Green Pigeon, *Treron calva*, and the Green Imperial Pigeon, *Ducula aenea*, on the nest site and which is possibly their equivalent of the nodding of *Columba* species. Cooing while on the female's back occurs in the copulation ceremonial of the Diamond Dove and some of the Australasian bronzewings (Goodwin 1960).

I hope these brief notes of Colin Harrison and myself will stimulate more detailed observations by the many aviculturists who have bred fruit pigeons, or any other species whose behaviour has not been recorded.

The accompanying sketches are intended merely to give an idea of the postures described. They have no pretensions to art or detailed accuracy.

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OBSERVING THE HABITS OF FOREIGN DOVES IN CAPTIVITY

By PROFESSOR CARL NAETHER (Encino, California, U.S.A.)

What has interested, indeed fascinated, me more than any other factor in enjoying foreign doves and pigeons in captivity is their individual habits as manifested in their day-to-day behaviour, particularly in relation to the habits of domestic doves and pigeons. In this essay I plan to emphasize distinctive behavior traits of species of foreign doves and pigeons which it has been my good fortune to maintain over extended periods of time in my aviary.

In appraising the value of my observations, the reader should remember that no two doves or pigeons, even those belonging to the same species, behave necessarily in the same manner. This behavior may be conditioned by many factors, over most of which their keeper has little or no control. They may include the following: whether or not the doves were raised in their native haunts or in captivity; how long they have been in captivity and how well they have adjusted to its limitations; whether they are kept under highly artificial or more or less natural conditions, and, of course, how carefully and humanely they are treated by their keeper. All these considerations, and many others, affect their behavior in captivity very much.

One of the most typical doves for study, not only from the standpoint of behavior but also from that of appearance is the Galapagos Dove. It made its first appearance in captivity in 1893 when four specimens arrived at the London, England, Zoo, and in 1923 at the New York Zoo. This small, short, plump bird looks neither like a dove nor pigeon, and is in this respect unique among foreign doves. I well remember the first pair I acquired quite some years ago. Almost the very moment I released

male and female into a planted aviary, containing a mixed lot of doves and softbills, they made themselves completely at home. At once they began to investigate the aviary from corner to corner, the feed dishes and the nestboxes, without in any way disturbing the other inmates of the aviary. Best of all, they were wholly unafraid of me, acting as if simply I belonged with them in the aviary. Their curiosity next centered on the aviary soil, which soon they punctured vigorously with their fairly long, curved beaks, apparently searching for beetles and grubs in the numerous holes they dug all over the aviary floor. This habit of probing the soil for nourishment is a distinct behavior trait of the Galapagos Dove, one I have not observed in any of the other species of foreign doves I have kept. Moreover, my pair lost no time in locating an open-front nestbox, soon thereafter building a flimsy nest with sticks and straws, and in due course raising young successfully. During their sojourn in my aviary, these unusual "undovelike" doves proved tame and trusting, wholly unafraid of me, and attending to their affairs without in any way bothering their neighbors.

The most notable behavior trait of the Snow Pigeons I once kept was their delightful liveliness: their flying and chasing about in the aviary, time and time again jumping in and out of the large, open-top nesting box, the while voicing their "clucks and croaks" in a very determined effort to coax a suitable mate to join them. Filled with overflowing energy, these handsome pigeons were "on the go and fly" seemingly the whole day long, and in this behavior strongly suggested that of certain varieties of domestic pigeons. So deeply absorbed were they in their goings and comings as to pay virtually no attention to me when I entered their private abode to feed and water them. That they were closely related to domestic columbae was shown by their eagerness to mate with blue Strasser Pigeons, there being no female Snow Pigeons available.

Among the gentlest "wild" pigeons I have ever had in my aviary was a trio of freshly imported Splendid Pigeons—two hens and one cock. This quite handsome threesome lived peacefully together during all the years they were in my possession. Even after mating and producing some offspring, old and young flourished without showing the slightest tendency toward disagreement. On the basis of this rather unpigeonlike behavior of freshly imported birds, I assumed that this species lived and nested in flocks in its native habitat, as is the custom of certain wild species of pigeons.

A lovely pair of Bartailed Cuckoo Doves deserve mention also owing to their almost astounding prolificness during the four years they have been mine. Always using the same nesting site in the half-dark of their private aviary, they have invariably brooded the single white egg faithfully, hatched it in 13 days, and nursed the squab to vigorous maturity. Their alertness when brooding amuses me, since it manifests itself only in the lifting of the head over the nest's edge as if to say, "please, don't come

closer, just leave me to my private business!" These beautiful long-tailed birds' behavior is characterized by seemingly day-long masterly inactivity, spent on the same high perch or else on the nest. Perhaps that is the main reason why in antique records they were considered being so-called "tree pigeons". Even though for the last two seasons their eggs have lacked fertility, the pair continues to lay them month in and month out, even during the winter months—truly an interesting couple!

And now a few words concerning a pair of Key West Quail Doves, which have graced a part of my aviary for the last seven years, raising many a youngster, but currently laying only infertile eggs. Their characteristic behavior trait lies in their sitting on the nest close together side by side not only at the time of "changing the guards," but literally for hours on end as if both male and female were determined to see the eggs hatch! Since they do not, or cannot, "sense" the infertility of their eggs, they usually continue to brood for 12-13 days. And though I have followed the well-meant advice of a friendly, concerned veterinary, giving them epsom salts, special vitamins, and what not, I am unable to effect a "cure," probably because the doves are too old to reproduce, so I just have to let them sit side by side and "enjoy" themselves! They are among my pensioners that have served me well in bygone years, therefore deserving of rest and quiet.

In conclusion, a brief mention of a pair of Bartlett Bleeding Heart doves which have been my possession for well over a year. Their behavior during all these months is marked by almost constant restlessness and shyness, which no doubt is responsible for their reluctance to nest. They live in a private compartment, wholly undisturbed by other doves and thoroughly well protected against outside enemies. Though I keep my distance when feeding them, they at once begin to run about wildly, certainly sore afraid of me. Such reactions are new to me, especially when they signify no change for the better in more than twelve months. My explanation of this undesirable behavior is that somehow or other they were not accorded the proper treatment by their former owner. However, they are a beautiful pair, not at all common in this country; so I shall continue to care for them hoping against hope that they will in due time change their behavior and "reform."

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THE HATCHING OF AN OSTRICH CHICK AT THE TROPICAL BIRD GARDENS, RODE, BATH, IN 1972

By D. H. S. RISDON (Rode, Somerset, England).

A pair of Ostriches at Longleat Safari Park laid a number of eggs and Mr. Roger Cawley, the Manager, kindly asked us if we would like to try our hand at hatching them, so they were placed in an incubator. Altogether six eggs were sent to us over a period of several weeks. Three proved to be infertile two developed chicks which failed to hatch, the remaining one did hatch and the chick survived for three weeks, eventually dying of Aspergillosis.

Details are as follows:

The temperature of the incubator was kept at 98°F for five weeks and 100°F for the last week. The eggs themselves were laid on moist sand and turned every morning and evening. Examination over a strong light showed that at 41 days the chick had penetrated the air sac within the egg; at 42 days it was tapping the shell; on the 43rd day the chick hatched with some assistance from our keeper, Martin Greene, who made a small hole in the shell at the end containing the air sac to enable the chick to breathe. This it could be heard doing quite clearly.

Hatching occurred on the 8th July 1972. For the first three days the chick did little. It neither ate nor drank and was very weak on its legs. At the end of this time it began to walk properly and was transferred to a pen indoors over which was suspended an infra red lamp. It then began to peck at clover and chopped grass. On the 11th July it took half grown locusts and was seen to drink for the first time. On the 14th July it was seen to take grit in the form of a mixture of flint, oyster shell and limestone. On the 15th July it was put out on short grass during sunny periods and it began to eat turkey pellets. On the 16th July it was grazing and eating pellets well.

From this time onwards it began to grow and seemed to be doing well, but on the 29th July it died. It was of course shut in at night and at all times had access to the infra red lamp during dull sunless periods in the daytime.

It should also be recorded that Woburn and Windsor Safari Parks kindly sent us eggs laid by their Ostriches, but unfortunately all were unfertile.

BREEDING OF THE VICTORIA CROWNED PIGEON *GOURA VICTORIA* AT BRISTOL ZOO

MICHAEL SHERBORNE (Overseer of Birds, Zoological Gardens, Bristol England)

During 1972 a Victoria Crowned Pigeon (*Goura victoria*) was hatched and reared at Bristol Zoo, which we believe is the first breeding of this species in Britain.

The cock bird has been in the collection since 1968 and a hen was acquired in February 1971. They have been part of a mixed collection in the walk-through tropical bird house since October 1971. Other species exhibited here include Rothschild's Mynahs, Nicobar Pigeons, Woodpeckers, Plovers, Broadbills, Hanging Parrots, Hoopoes and small insectivorous species.

Mating began in the middle of December and a few days later the birds started building a nest in an artificial tree in the centre of the public walking area. The nest was typical of pigeons, an untidy heap of sticks about 18 inches across and it was 14 feet above ground level. The first egg was laid on 11th March from a branch outside the nest and it broke on the floor below. Another was laid on 6th May but there was no sign of hatching after the incubation period of 28 days. We left it for a few days longer but it was stolen before we could check if it had been fertile. A third egg was laid during June and was removed, addled, after the incubation time. The fourth egg, laid in August hatched on 11th September.

The parent's food consisted of insectile mixture with chopped fruit, cut maize, wheat and turkey breeders' pellets. They also had free access to livefood (maggots and mealworms). Both fed the chick until it left the nest on 11th October and for several weeks afterwards. It feathered quite quickly and for a few days before it left the nest it would stand on the edge flapping its wings, looking an exact miniature replica of the parents except for the less well-developed crest. In about 10 weeks it was as large as the parents. The only visual difference in the sexes appears to be in size and as far as we can ascertain the youngster is a hen

As described above the Victoria Crowned Pigeon (*Goura victoria*) has been bred at Bristol Zoo. It is believed this is a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Ireland is requested to communicate at once with the Assistant Editor.

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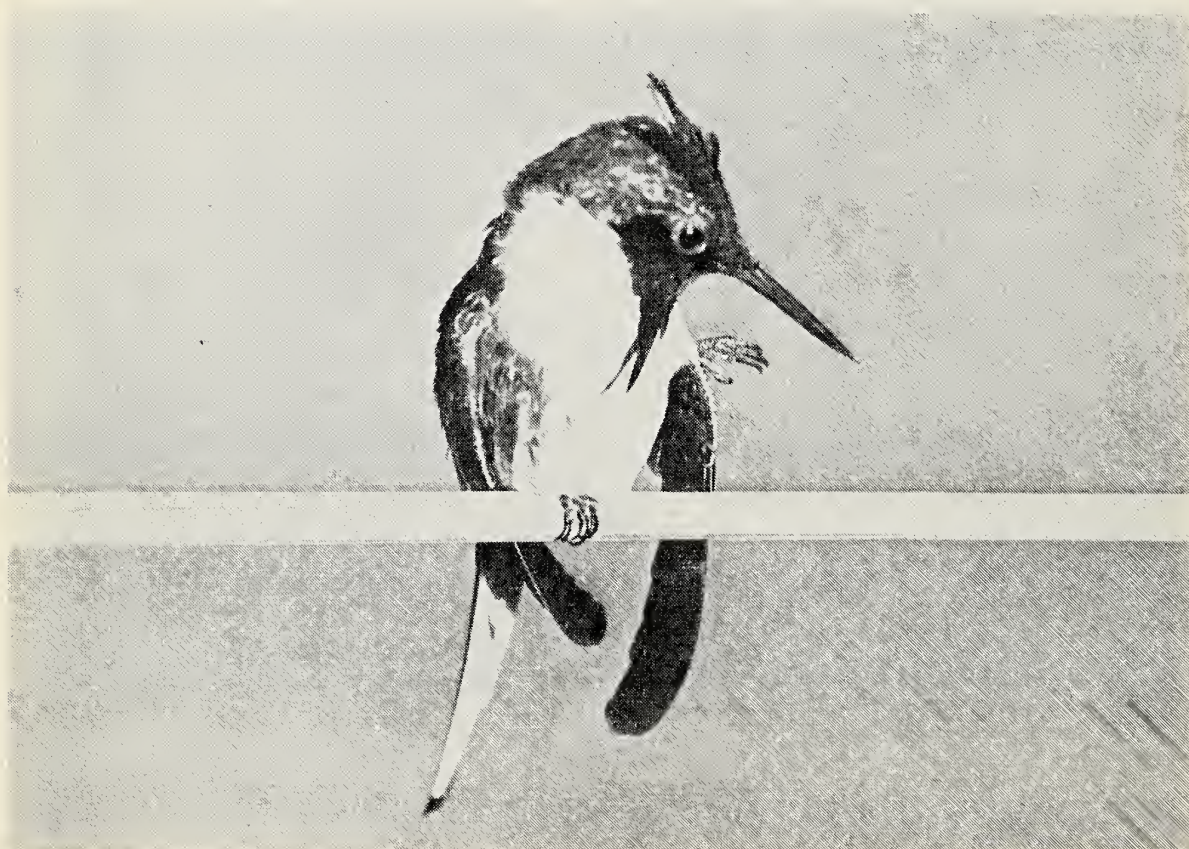
[J. Buck

Victoria Crowned Pigeon with young, a few days after it left the nest

Copyright]



Horned Sungem Hummingbird male in immature plumage



Copyright]

[A. J. Mobbs

Horned Sungem Hummingbird male in adult plumage

THE HORNED SUNGEM HUMMINGBIRD

By A. J. MOBBS (Walsall, Staffordshire, England)

The Horned Sungem, *Heliactin cornuta*, is found in central and eastern Brazil. The species is rarely seen in captivity, indeed at the time of writing, I believe the male in my collection to be the only one in this country and probably in Europe. P. H. Hastings brought a number of these birds in during the summer of 1957 and has, I believe, imported only the occasional one or two since then (Hastings, 1969). M. W. Clifford imported two males during the spring of 1971.

One of the males imported by Clifford went to a collection in the north of England; it was an adult. This bird died during the latter part of 1971 due to a number of abscesses forming in and around the bill. The other male, which was immature, I purchased.

Adult males are approximately $4\frac{1}{4}$ in. overall length. As $1\frac{3}{4}$ in. is taken up with the tail feathers and a further $\frac{1}{2}$ in. by the bill, it can be seen that the Sungem is one of the smallest of the Trochilidae if the bodysize only is taken into account. I have read that if the tail were taken away, *H. cornuta* could be compared to the smallest of birds, the Bee Hummingbird, *Calypte helenae* (Greenewalt, 1960). Not having seen a live specimen of the latter, I am not in a position to argue. I would point out, however, that the Reddish Hermit, *Phaethornis ruber*, is certainly smaller bodywise than the Sungem.

The adult male Horned Sungem has upper parts of shining greenish gold which reflect a coppery sheen in certain lights. Sides of head are velvety black which is carried on to the throat and terminates in two points on the upper breast. Occasionally these feathers (hereafter referred to as the beard) merge into a single point. The sides of the neck and upper breast are pure white, these feathers forming a ruff thus highlighting the velvety black beard. Lower breast and belly are also white, but as these feathers are not so dense as those which form the ruff, they do not have the intense whiteness of the latter. The crown is glittering dark blue, at the sides of which are iridescent tufts (hereafter referred to as horns), which are glittering golden green turning to glittering ruby red at the base. In certain lights these horns appear blue except for the base which always appears as ruby red. The tail feathers are narrow, pointed and much graduated. The central pair being shining dark green and the remainder white with the outer edge green. At no time is the tail held in a forked position; I mention this having seen illustrations depicting the species with a forked tail.

Females are very much like the males, but lack the glittering feathers on the crown and the black beard. Also the outer tail feathers have a black oblique band near the base.

As already mentioned, the male I have in my collection was in immature plumage at the time of purchase. It was very much like a female in appearance except for a thin line of glittering blue feathers along the centre of the crown and a few black feathers on the upper throat. The blue feathers are erectile in the adult; in the immature bird they were small and insignificant. Like the female, the immature male had an oblique black band near the base of the outer tail feathers. The two central feathers were shining dark green, but in the immature bird they were broader and not so long as in the adult.

I purchased the Sungem on 21st May 1971. Other than being somewhat fatigued after the long journey from Brazil, the bird was in excellent health and the following morning, after a good night's rest, was in excellent spirits. In fact as soon as the birdroom lights were turned on, the bird commenced to sing most exuberantly.

I believe this bird may have been moulting at the time of purchase, but it was not until 23rd June, that I noticed feathers being shed in any number and then it was breast feathers only which were found in the bird's cage. It was another month before any flight feathers were shed. Shortly after this, the bird commenced to moult in earnest and each week a little more of the black beard appeared. Half the flight-feathers had been renewed before any tail feathers were shed. The black and white outer feathers were the first to go and it was 27th November, before the two central green feathers were dropped.

The iridescent feathers on the crown and the horns are of course the outstanding feature of this species and as there was no sign of these coming through until the beginning of November, I had by then begun to despair of ever seeing my bird with horns. However, on the same day as the central tail feathers were dropped, I wrote in my diary "The horns are at last showing on the Sungem!".

As can be seen, the moult from immature to adult plumage was an exceptionally slow process, especially for a hummingbird and it was 14th January 1972, before it was finally completed. Exactly 34 weeks!

Perhaps I should point out that although this was an exceptionally slow moult, the bird was in excellent health throughout and when it did eventually attain adult plumage, it was feather perfect. It will now prove interesting to see how long it takes the Sungem to complete a normal annual moult.

I have found the Horned Sungem to be one of the most robust of the smaller hummingbirds; it is also one of the most vocal. It is rare indeed for me to enter the birdroom and not hear this bird singing, in fact from first light until approximately 7 p. m., it is rarely silent. The song consists of an oft repeated chittering note terminated with a loud chirring note which is repeated three or four times. This song is sung both on the wing and when the bird is at rest. In both cases it is uttered almost continuously with a break of only a second or two in between each phase.

As well as the song, the Sungem will on occasions utter a loud "twitting" note. This is heard especially when the bird is inspecting a strange object, or when alarmed. Perhaps I should add that this note seems to be used only when the bird is on the wing.

As with most of my tiny hummers, the Sungem is housed in a cage on its own. The cage front is 1 in. by $\frac{1}{2}$ in. welded mesh, painted black. There are two doors cut into the mesh, each 7 in. by 6 in. To prevent injury to my hands and to the bird, black adhesive tape surrounds each opening. I mention this because the Sungem often displays to this tape. It will also on occasions display to one of the perches in its cage. When displaying to the tape, the bird moves from side to side on rapidly beating wings, uttering the chittering notes used in the normal type song. The bird often hovers in front of the tape, touching it with the tip of its bill, after which the body is moved up and down and from side to side very rapidly. When the bird directs its display at the perch, it is very much the same as when directed at the tape, except that the bird moves from side to side in an arch instead of in an almost straight line. As well as performing the rapid movements already mentioned, the bird will occasionally hover directly above the perch, touching it with its bill and extended beard feathers, after which the bird alights and goes through the actions of mating. Throughout the display procedure the beard is extended, but at no time have I seen the horns spread. This is rather surprising as I should have thought these feathers would be used during the display even more so than the black beard.

The iridescent head feathers and the horns can be erected slightly; many hummingbird species are able to erect their head feathers, however, so this is not at all uncommon. When the Sungem preens its wing butts or scratches its head, the horns do appear to be fanned slightly. Whether the bird can do this at will or during certain preening postures only, I am unable to determine.

At the time of purchase, I fed the Sungem a mixture of Super Hydramin and sugar. After a week on this mixture, I persuaded the bird to take the diet I usually feed hummingbirds, namely equal parts Stimulite nectar paste and clear honey. I would not call this bird highly insectivorous, however, it does take around fifteen to twenty fruit-flies each day. These flies are taken from either the sides of the cage or from the wire mesh front. The bird takes hold of a fly with the tip of its bill, tosses the fly in the air and catches it with gaping bill, then swallows it all in one deft movement. At no time have I observed the Sungem hawking flies. I have noticed the bird prefers the smaller fruit-flies, large one's being left strictly alone. If the Sungem accidentally drops a fly it has caught, it will pick it from the floor of the cage, toss it in the air and then swallow it.

The Sungem prefers a shallow saucer of water in which to bathe and takes at least one bath each day. Compared to many hummingbird species, this bird is not what I would call over-fond of water. It dislikes

being sprayed and because of this, I subject it to one a week only, prior to cleaning its cage.

Claw trimming is an exacting chore which has to be carried out periodically. As the Sungem has the smallest legs and feet of any species I have yet encountered, the task has proved even more harrowing than usual. Unlike the Reddish Hermit (Mobbs, 1971), the bill of the Sungem does not require trimming. It did become overgrown a few months after purchase, but the overgrown portion sloughed off of its own accord.

There is a belief that if birds are supplied with perches of a different thickness, the need for claw trimming is eliminated. This is not the case with hummingbirds and these birds should always be supplied with perches which they can grip with ease, otherwise their claws will eventually become deformed. I might add, it is extremely cruel to allow the claws of a hummingbird to become overgrown, as these birds use their claws for preening areas which cannot be reached with the bill.

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REPORT ON THE TROPICAL BIRD GARDENS RODE, 1972

By D. H. S. RISDON (Rode, Somerset, England)

This has been an average year for breeding results with no spectacular successes. The nearest was the attempted breeding of our pair of Casqued Hornbills. In 1971 the cock partially walled up a hole in a barrel put up for them but never got any further. This year he actually walled the hen in but after about a week she broke out again and no further interest was taken in the barrel. It is difficult to be certain but, in addition to mud, the cock appeared to use regurgitated food as "plaster". This mixture hardened off to the consistency of baked clay and one wonders whether saliva from the bird's crop had something to do with it.

In the autumn of 1971 a young White Stork was brought into us by the RSPCA which had fallen down a chimney and was covered in soot. The bird carried an aluminium ring and turned out to be one of three siblings which had left the nest in Jutland some weeks earlier. It seems strange that they should have drifted so far west as they were all seen in the Bath area and the remaining two were plotted down into Cornwall. "Sooty" was in poor condition and clearly in no fit state to continue his journey so, after consultation with our Editor, in her capacity as Secretary

to the I.C.B.P. we clipped the flight feathers of one wing and turned him out with our other storks at liberty in the grounds where he soon settled down and spent the winter and following spring. During the summer he gradually moulted his flight feathers and became airborne again in August. He stayed with us for some weeks and made a fine sight on the wing, always returning in the evenings. At the beginning of September however the migrating urge was evidently too strong and he disappeared. He was by now in perfect condition so I hope he was able to make the long journey.

Sacred Ibis reared five young. We have bred so many of these that we tried a few at liberty. They stayed well for months soaring above the grounds and foraging in the nearby fields. At nightfall they always returned to roost on the aviary containing the breeding colony. Eventually however they started to wander. One was caught and sent to Slimbridge who passed it to Len Hill at Bourton-on-the-Water who kindly returned it to us. Another was reported up in the Leicester area but we never heard any more of it.

Scarlet Ibis nested and laid but the eggs came to nothing. I think that the early part of the summer was too cold and wet. The only time they really did well was the first time we bred them in 1970 and that summer there was a fairly long hot dry spell of weather.

Our self maintaining flock of Cape Penguins is at the time of writing down to nine birds—the lowest since they started to breed regularly. Part of the reason for this is that some of the original birds imported in 1962 have died obviously from old age so that the death rate has exceeded the birth rate.

The old pair of Blue and Yellow macaws reared two fine young ones, making seventeen all told since they started breeding in 1965. A pair of Red and Yellows reared two for the second year in succession. What is particularly interesting is that a pair of our own home-bred Blue and Yellows nested and laid this year. They were six years old. Unfortunately the eggs came to nothing and we hope for better luck next year. I think that this is quite as important as a first breeding if we are ever to establish breeding stocks of foreign birds.

Leadbeater's cockatoos reared one, Roseates did nothing largely due to the death of our old breeding hen the previous winter. We have kept several of her progeny but so far they do not appear to be mature enough to breed. Citron Crests hatched a chick but let it die. Umbrella cockatoos reared a nice young one—the third in four years. They never rear more than one at a time.

Illiger's macaws reared two fine young and Derbyan parrakeets two. Rosellas, Stanleys and Mealies all produced a fair crop of young as did White cockatiels and Lutino Ringnecks. Plumheads laid but failed to hatch. It is worth recording that for the first time in my experience a pair of Stanley parrakeets were double brooded—rearing two broods of four.

We have four species of Amazons at Rode including a pair of Orange-winged. The latter are very pugnacious and have to be kept on their own. Last spring we were as usual short of aviary space so we decided to put them in a little aviary and wing clip them so that they could wander loose during the day. In quite a short space of time they moulted their clipped flights and started to fly, since when they have been a great success as liberty birds, homing to their tiny aviary every night and sleeping in their nest box. Their colouring is a perfect camouflage and when they land in a tree, they just disappear.

New arrivals among our parrot collection in 1972 were two pairs of Red-sided Eclectus, a Black Lory and a New Zealand Kea.

Twelve grey Peacock Pheasants were bred and quite a few Golden Pheasants were reared at liberty by their own mothers. Exactly how many it is difficult to say, but at least three hens were seen with young and our liberty flock is well up in numbers with immature birds. There is a good deal of extra work in rearing pheasants so we now concentrate on rearing the more valuable species by hand and just raise a few of the commoner ones to keep the numbers up.

We have a somewhat elderly cock Himalayan Monal kindly deposited with us years ago by the Rev. P. K. Venner. This bird is infertile so we decided to give him his liberty on the grounds. As usual with pheasants, from being a nervous bird in an aviary where we hardly saw him, he has become quite tame and looks truly splendid as he strides about at the edge of the wood. He is full winged but never flies except to roost. We see far more of him than of those kept in an aviary.

Blue Crossoptilons have been a disappointment as liberty birds. We built up a flock of nine which stayed well for a while, but the cocks became aggressive in the spring and they scattered over the surrounding countryside, never to be seen again. We have found the same with Swinhoe's which, once they are mature, are solitary and aggressive. New arrivals in 1972 were two immature Great Argus Pheasants. These were purchased as a pair but I am afraid are moulting out two cocks.

Our liberty flock of Carolina Ducks continues to increase and we have counted as many as fifty birds at feeding time in the winter. At least one pair with young have been seen on the River Frome nearby so there is reason to believe that some pairs go off and rear their young unaided, bringing them back to join the main flock when they can fly. As the Carolinas increase, so do the Mandarins decrease in numbers, largely I think because the Carolinas usurp every available nest box at breeding time.

A small number of other ducks and geese were reared including Pintails, Tufted and Red-crested Pochard, Barnacle, Barheaded and Lesser White-fronted Geese.

I have sadly to record the death of our old Lidth's Jay. This bird must have been well over twenty years old and I have previously recorded his past history.

One of our pairs of Occipital Blue Pies again reared two healthy young ones.

The following nested and laid but the eggs never hatched: Rothschilds Mynahs Andaman Mynahs, and Purple Glossy Starlings.

New arrivals among the softbill collection were Formosan Blue Pies, Black-collared Mynahs, Black Bulbuls and Azure-winged Magpies. We also managed to acquire a young male Great Indian Hornbill as a mate for our solitary female.

* * *

BREEDING BIOLOGY AND BEHAVIOUR OF THE SOUTH AFRICAN HEMIPODE IN CAPTIVITY

By G. MICHAEL FLIEG (St. Louis, Missouri, U.S.A.)

The following studies and observations were accomplished while I was Curator of Birds at the Brookfield Zoo, Chicago. I wish to thank the following individuals who assisted me in compiling the data on egg and chick weights and measurements: Paul R. Meppiel, John Gruetter, and Ann Owens.

In September 1969, three pairs of South African Buttonquail *Turnix sylvatica lepurna* were obtained from a local dealer. They were imported, wild-trapped birds. They were placed in a cage 3 × 1 metre which they shared with Nyassa Love birds, Double-banded Sandgrouse, Kittlitz Sand Plover and Chestnut-backed Sparrow-lark. The African Waterhole Exhibit as it was called was provided with sand and plastic boxhood clumps. All of the above species got along quite compatibly. The breeding of the hemipode appears to be first recorded for the Americas.

FEEDING

The Hemipodes were fed on Purina Game Bird Chow mixed with Purina trout chow and small seeds. During breeding, mealworms were supplemented. Food items offered to the other residents of the exhibit were sometimes taken. These included fruits, ground meal, oyster shell and pigeon pellets.

DESCRIPTION

The size differences between males and females are shown on Table 1. The hen is spotted along the side of the chest and neck with large black spots. The smaller male is streaked with many more smaller spots.

TABLE I. ADULT MEASUREMENTS

<i>Turnix sylvatica lepurna</i>			MALE	FEMALE
			(mm.)	(mm.)
Wing			70-82	78-90
Tarsus			20-23	21-24
Bill			11-13	13-15
Tail			32-45	35-38
Length			141-157	154-162
			(gm.)	(gm.)
Height			34.5-47.5	54-62.9

CALLS

The calls I can attribute to this species are as follows:

The flock call is a high pitched almost inaudible chirping sound.

The alarm call is similar but much louder.

The female utters the courtship booming sound, and a growling buzz used to threaten other birds.

The male utters a trumpeting buzz to threaten other males.

COURTSHIP

Courtship begins in early February. It is initiated by the polyandrous hen. She begins to take long strides—back parallel to the ground while gently rocking the body back and forth. Sometimes the hen lies down and the head and neck alone assume this rocking motion. This ritual attracts males into her territory and the next phase is performed in the presence of the cock birds. The female bends the legs and erects itself to a 45 degree angle (shown in the plate); the neck is then stretched and the oesophagus inflated producing a booming sound reminiscent of a pigeon but deeper. The female next sits and scrapes with the beak. The male then gently pecks her head and nape and copulation occurs. The female sometimes takes this initiative and mounts the male. As far as I know this is the only instance of a female bird mounting and actually copulating the male.

NEST AND EGGS

A simple scrape in the sand is the nest site although the nest is usually placed alongside or under a pile of straw or artificial plants. The female rolls the eggs about in all directions for 10-20 cm.; later in the day they were rolled back into the nest. The normal clutch is four eggs but six to eight eggs were sometimes found in one nest probably the result of two hens laying in it. As many as eight nests were built for the three pair of birds and eggs were deposited in each. They are rolled by the female; she uses her beak and backs up rolling the egg between her legs. The first egg was laid on 25th February 1971, eggs are 20 to 28.5 mm. in length and 16-20 mm. in width. They weigh 2.75 to 5.1 gms. The ground colour is cream and they are streaked, spotted or blotched with chocolate brown. The three hens laid a total of 302+ eggs from 25th



South African Button Quail

Courtship posture of female; male on eggs; chicks; male feeding young

[Reproduced in half tone from the painting by David McKelvey]

February to 24th September. This averages out to 100+ eggs per hen in a seven month period or an average of an egg per hen every other day.

Amazing as this may seem the following observations are more startling.

On 26th May at 1.30 p.m. all eggs were taken from the cage. The next day at 2.10 p.m. five eggs had been laid. At 11.20 a.m. on the 28th, 19 eggs were evident. The three hens therefore laid 14 eggs in 20 hours. The largest hen was observed laying an egg at 8.00 a.m. and again at 11.00 a.m.—two to three hour interval. At 8.15 a.m. on the 29th there were 27 eggs in the cage and at 5.05 p.m. the same day 35. A total of 43 eggs were removed at 10.30 a.m. on the 31st. Egg laying then tapered off a bit as on 1st June there were seven eggs, on the 2nd eleven, and at 10.45 a.m. only 14. At the peak of laying—28th–29th May—the average eggs laid per 24 hours was 5.4 and 4.2 respectively. Only one ovary was functional as determined by X-ray and dissection.

(*Editorial Note.* The very striking egg-laying results which Mr. Flieg records appear to be unique not only for this species but for birds as a whole. In order to maintain a more balanced picture it should perhaps be pointed out that previous observations on the breeding of this and other *Turnix* species in captivity have shown a more typical egg-laying rate of one per day. Mr. Flieg's results suggest some abnormal factors present over a seven-day period when observations were made. His reference to paper-thin shells may also indicate this since Schonwetter's eggshell data give a similar shell-weights for this species and the Painted Quail.

Mr. Flieg's further comments as follows—"My hypothesis on the *Turnix* egg production is this. We may assume that in the natural state a hen lays a clutch with one mate, finds another and repeats the performance. However, in a crowded situation in direct competition with other hens for several males, the stimulus of the presence of the males may be enough to increase the hormone flow and speed of ovulation; this being a direct result of intraspecific competition. This theory requires of course careful testing to see if it is correct".)

The male alone incubates the eggs but in the confines of the cage it became an impossibility. The broody males were constantly harassed by the hens until they deserted the eggs. Only once was a male able to hatch a clutch in the cage. The incubation period is 12–13 days.

INCUBATION AND HATCHING

Most eggs were taken from the cage immediately and placed into a forced air incubator at 99½°F and 85°F on the wet bulb. Out of a total of 383 eggs laid between 25th February 1970 and 23rd January 1971, 127 eggs hatched and 54 chicks were reared to maturity. After pipping the eggs the chick always hatched in 10–20 minutes. The egg shell was paper thin. The fertile eggs lost an average of 18% of their initial weight and the hatching weight of the chicks varied from 2.2 to 3.09 grams with an

average weight of 2.67 gm., perhaps the smallest precocial bird. At hatching the total body length is 42–45 mm., the wing 7–9 mm., tarsus 9–10 mm., bill 4.5–5 mm. Female chicks can be distinguished at two days of age as they boom and assume the courtship stance of the adult.

FEEDING

The newly hatched chick is a bill feeder and is fed by the male. The male picks up the food items and offers them to the young which snatch them greedily. We start the young birds on very tiny mealworms. Within two to three days they are feeding themselves on mealworms, game bird crumbles, and tiny grass seeds sprinkled with LIV as a supplement. The chicks are fed many times at least once per hour and after feeding are called back to be brooded by the male.

We tried unsuccessfully to hand-feed the young although they were fed many times day and night. Males were not broody in the presence of hens but when isolated from the females they never refused to accept chicks. At one time, when a group hatched, too large for one bird to accommodate, we introduced another male into the same cage and both birds assumed care of the young. The chicks that hatched in the communal cage would run to the hen also for food, taking it from her beak although she had no intention of feeding them.

CAPTIVE MANAGEMENT

For optimum breeding in the species, it is important that a sex ratio of two to three males per female be used. Males can then be removed to rear the young without loss of fertility. Males are very broody and two or more can be placed into a single cage with their broods without any fear of aggression. The young are able to take care of themselves at about three days of age and can safely be removed from the parent at age 5 days.

GROWTH AND MATURATION OF YOUNG

The chick hatches with only down. On the second day the primaries begin to show and the down attached to their tips, and the quill-sheaths slough off them on the 14th day. The hatching weight is doubled at one week of age. Flight is achieved at 7–11 days of age. At this age feathers appear on the rump, back and sides of back. At 13 days of age feathers begin on abdomen and middle breast. On the 18th day head and thigh quills appear, the downy tips fall off the tail-feathers and full plumage is attained. On the 22nd day yellow appears on the throat and minimum adult proportions are achieved at 27 days of age. At this point the male growth curve levels off and females continue to grow. At 37 days of age copulation occurred among the young birds and at 39 days sexes are distinguishable by size, weight and measurements. The first eggs are laid at age four months. The Growth and Maturation of this species was contrasted with that of a Galliform bird, the Painted Quail,

Excalfactoria chinensis. The results are shown in Table 2. The indication is that hemipodes are much faster growing and maturing.

TABLE 2
CONTRAST IN GROWTH AND MATURATION BETWEEN A HEMIPODE
AND A GALLIFORM BIRD

	<i>Turnix sylvatica lepurana</i>	<i>Excalfactoria chinensis</i>
Egg size	20–28.5 × 16–20 mm.	20–27 × 18–22 mm.
Egg weight	2.75–5.1 gm.	3.05–5.6 gm.
Weight loss of fertile eggs ..	18%	12%
Weight of chick	2.2–3.09 gm.	2.1–3.25 gm.
Primaries begin	2nd day	7th day
First juvenile plumage ..	18 days	30 days
Age of sex differentiation ..	27 days	30 days
Age of adult size	39 days	50 days

SUMMARY

Observations were made on the South African Hemipode, *Turnix sylvatica lepurana*. Calls, courtship and nesting behaviour are described. During a brief period birds were noted laying five eggs per day. Incubation and hatching data are given. The male feeds the young at first; and a technique is described for successful rearing. Growth and maturation of the young is described, and contrasted with that of the Painted Quail. The hemipode is sexually mature at 37 days although no eggs are produced until the female is four months old.

* * *

KEEPING AND BREEDING THE COLLARED SCOPS OWL

Otus bakkamoena

By B. SAYERS (Chelmsford, Essex, England)

INTRODUCTION

Although diverse species of the Strigiformes are distributed over the entire surface of the earth, with the exception of the Antarctic, and many of these species have been known to aviculture for many years, relatively little detailed information seems to have been recorded in concise form. When I decided to specialise in keeping and attempting to breed Owls in 1970, I resolved to make a modest contribution to recorded information.

The present notes refer to the Collared Scops Owl, the reason being that a friend of mine, Mr. Harry Smith succeeded in breeding this species in 1972 and due to pressure of business he has asked me to record the details. The information recorded below is an amalgam of Mr. Smith's experience in breeding these birds, a collation of extracts from the writings of other authors and my own experience in maintaining two males in captivity for three years.

If any readers of this magazine can enlarge on, corroborate or have any reason to think any of the remarks erroneous, I hope that they will either write an article or letter to the editor, or to me. It is only by pooling information that any significant contribution to science can be made.

DESCRIPTION

The sub-species of *Otus bakkamoena*, are from written descriptions, very similar in appearance and the identification of an individual would seem to be rather difficult without access to a comprehensive reference collection.

For a detailed description, I include the details of the colouration of my birds, which although imported from Northern India are of uncertain identity. Iris dark brown. Eyelids and tear streak dark brown, the edges of the eyelids are pink. Face fawn. Lower eyebrow white, the upper eyebrows which stretch to the upper side of the ear are fawn. The face is edged with dark brown. The crown is dark brown, mottled with lighter shades of brown. Breast fawn, with pronounced broken vertical barring of dark brown, faint transverse barring of greyish brown. Back medium brown, mottled with dark brown—edged with a row of fawn feathers. Flight and tail feathers horizontally barred with alternate stripes of light and dark brown. Legs feathered, but toes naked, toe colour greyish pink. Claws horn coloured with grey tips. Cere pink, beak horn coloured. Length $8\frac{1}{2}$ ins.

The species has a wide distribution, from the Persian Gulf through Pakistan, India, Burma, China, Japan, Korea and Ussuriland and south through Indo-China, Malaysia, and Indonesia, to Java, Borneo, and the Philippines.

CALLS

Various authors give the call as “too-who”, “kwo-oo” or “wo-wo-wo, wo-o, o-o” and also mention another call of “kwow” repeated in quick succession.

My own birds (two adult males and the two sub-adults bred by Mr. H. Smith) utter a call of “he-ooo”, with the first syllable more emphasised and higher in pitch. They also repeat a growling “kwow” in quick succession, the head being thrust forward and bowed with each call. My birds also emit a greeting call either to each other, or to me when I approach their flight with food, which can be best described as a plaintive mew. I have also observed my birds looking into each other's faces and making a twittering call.

When alarmed or angry, my Collared Scops Owls fan their wings, thrust their heads forward, clap their beaks and make a deep throaty growl.

FOOD

Authors cite insects as forming the bulk of the Collared Scops Owl's diet, although birds, small rodents and bats are mentioned. My birds readily take white mice and day old chicks, the latter being preferred. I have offered live locusts, but although some were taken, they were mostly ignored; mealworms remained in the flight for many days, but as they were not touched were ultimately removed.

It might be opportune to mention here, that in the past and to a lesser extent today, many captive raptors die unnecessarily as the result of incorrect feeding. My two original birds were bought by a friend of mine who saw them at a well-known dealers', after admiring them but explaining that she was unable to provide a suitable diet, the vendor explained that he was feeding them entirely on minced raw beef and that was perfectly adequate. After being assured that beef was a suitable diet, my friend bought two of these Owls, but after they settled in her accommodation it was obvious that both birds were seriously ill, being very thin and weak. Fortunately the diet was immediately changed to mice and a complete recovery was made by both birds, which were then transferred to my collection. Subsequent investigation showed that the dealer in question imported several Small Indian Owls, but all gradually deteriorated in health and I feel certain that this deterioration can be attributed to the unsuitable diet.

Another instance brought to my notice, was that of a dealer who imported a number of Scops Owls and only offered whole Guinea pigs as food. Of course, such large carcasses are totally unsuitable for small Owls as they are unable to break them up. I understand that this thoughtlessness caused the death of most of the Owls.

I think that the rule that should be applied to all Owls, is that they should be fed whole carcasses (insect, bird or mammal) which are of a suitable size to be eaten in their entirety.

NIDIFICATION

The Collared Scops Owl nests in hollows in trees, cavities in buildings or cliffs or in the bases of large nests, such as those of Vultures. Two to five white eggs are laid from December to April depending upon locality and measure in average of 35 mm. \times 28 mm.

BREEDING IN CAPTIVITY

It would seem that Scops Owls have so far only been bred infrequently and I can find no previous record of the Collared Scops Owl breeding in this country.

The Scops Owl, *Otus scops*, (Meade-Waldo 1899) and White-faced Scops Owl, *O. leucotis*, have been bred in captivity and Prestwich (1955) notes that two Plume-footed or Half-Collared Scops Owls, *O. b. semitorques*, are listed in the sale catalogue for Spedan Lewis' famous collection of Owls, with the information that they "have nested". However although I

have searched through available literature, I can find nothing to indicate that any youngsters were reared.

The Collared Scops Owl was bred with considerable success at the Zoological Gardens Dehiwela, Ceylon, during the 1940's. Several pairs were kept in a large aviary along with a solitary Black Bittern. Nest-boxes were situated in opposite corners of the aviary and the birds bred frequently.

The birds bred by Mr. H. Smith at Basildon, Essex, were imported during the summer of 1970 and were thought to be two males and two females. The four birds were housed in an outside aviary in Mr. Smith's collection which, until 1971, was in Devon. In 1971 the collection was moved to Essex and while a new zoo was under construction, the Collared Scops Owls were housed temporarily in a 4 ft. stock cage in a draught proof and well lighted, but unheated, shed. It was in this accommodation that the breeding occurred.

In early May 1972 it was noticed that two of the Scops Owls had paired and courtship behaviour was observed, therefore two nest-boxes each 12 in. \times 12 in. \times 12 in. with a vee-shaped entrance hole, were stood on the floor in opposite corners of the cage. The mating pair occupied one box immediately and three eggs were laid, all hatched, but one disappeared after a week. The remaining two youngsters were reared without problems and left the nest-box when between five and six weeks old. The youngsters were identical in size and colouration to the parents, there would appear to be no juvenile stage regarding colouration. Unfortunately it was not possible to examine the nest frequently, so period of incubation, dates of laying, hatching etc. are not known. The adult birds were rather shy and resented disturbance, so they were left alone as much as possible. The two other adult birds remained in the cage throughout this period and no friction was noticed.

Mr. Smith's owls are all fed entirely on chicks and the Collared Scops Owls reared two strong youngsters on this diet without additives. They also had clean water for bathing always available. Many owls bath frequently and my Collared Scops bath on average three times a week. I have on several occasions observed incubating owls of various species, bath and then return to the nest with the feathers very wet. I think therefore that it is most important that bathing facilities are always available for incubating owls, as they would seem to use this method of adjusting the humidity of the nest to the correct level for hatching. It should also be noted that owls will not normally bath in water that is stale or dirty.

When independent, Mr. Smith's two young owls were transferred to my collection and on comparison proved to be identical in size, markings and colouration to my two original birds (described earlier).

With only Mr. Smith's breeding pair of certain sex, it is difficult to make any meaningful observation on factors that indicate a bird's sex, however going purely on this very slender evidence it would seem that the female is larger and has darker and more pronounced marking on the crown—this however may first prove to be individual variation.

CONCLUSIONS

Obviously with my limited experience and the scanty information at my disposal any conclusion will have to be recognised as being provisional. It would seem that Scops Owls can be bred in captivity without too much trouble, the paucity of previous successes, probably results from few attempts rather than insurmountable problems.

As described above, the Collared Scops Owl, *Otus bakkamoena*, has been bred by Mr. H. Smith. It is believed that this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Hon. Assistant Editor.

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NEWS FROM THE BERLIN ZOO

By PROFESSOR DR. HEINZ-GEORG KLÖS

Rare newcomers are a pair of Iris lorikeets (*Psitteuteles iris*). These birds have so far only a few times been offered for sale by dealers and are not well known to scientists. Even detailed special works contain but few data on the habits of these parrots, so our zoo is very glad now to keep a pair of them.

Though breeding successes in autumn and winter are not too frequent, we did have some as follows:

5 Eastern Turkeys (*Meleagris gallopavo silvestris*), 1,1 Silver Pheasants (*Gennaeus n. nycthemerus*), 3 Rock Doves (*Columba livia*), 3 Olive Pigeons (*Columba arquatrix*) and 5 Budgerigars (*Melopsittacus undulatus*).

New arrivals include:

0,1 South African Shelduck (*Tadorna cana*), 1 Ruddy Shelduck (*Tadorna ferruginea*), 1,1 African Pochards (*Netta erythrophthalma brunnea*), 10 Barrows' Goldeneyes (*Bucephala islandica*), 4 Goosanders (*Mergus merganser*), 4 Red-breasted Mergansers (*Mergus serrator*), 6 White Storks (*Ciconia c. ciconia*), 6 Black Storks (*Ciconia nigra*), 2 Painted Storks (*Ibis leucocephalus*), 1 White Spoonbill (*Platalea leucorodia*), 1 Common Impeyan (*Lophophorus impejanus*), 1 Emerald Dove (*Chalcophaps fimbriatum*), 4 Pondicherry Vultures (*Sarcogyps calvus*), 1 Old world Kestrel (*Falco t. tinnunculus*), 1,1 Gang-gang Cockatoos (*Callocephalus fimbriatum*), 1,1 Cockatiels (*Nymphicus hollandicus*), 1,1 Iris lorikeets (*Psitteuteles iris*), 3 Keel-billed toucans (*Ramphastos sulfuratus*), 2 Gold-fronted fruit-suckers (*Chloropsis aurifrons*), 3 Superb tanagers (*Tangara*

fastuosa), 2 Blue-and-black tanagers (*Tangara velia cyanomelaena*), 1,1 Three-coloured mannikins (*Lonchura m. malacca*), 0,2 Golden-breasted waxbills (*Amandava subflava*), 2,2 Crimson Seed-crackers (*Pyrenestes sanguineus*), 1,1 Peter's twin-spots (*Hypargos niveoguttatus*) and 1,1 Melba finches (*Pytilia melba*).

* * *

NEWS AND VIEWS

In view of the concern felt about the possibility of extermination of some of the Amazon Parrots of the Caribbean region it is pleasing to hear of the first breeding of Guilding's Amazon, or the St. Vincent Parrot, at Houston Zoo, Texas. The breeding was from two of five birds from various zoos and individuals brought together for this purpose. One young one was raised.

* * *

David Lack and family, who visited St. Vincent in 1971 to study the bird-life saw this parrot in all rain-forest areas that they visited and commented that "it should survive provided enough rain forest survives". Like a number of other rare bird species its ultimate fate appears to depend largely on the lumber industry. It appears, however, to be in a slightly better state than the Puerto Rican Parrot which, according to a recent study by Dr. Kepler, has declined from c. 189 in 1969 to c. 15 in 1971. Faced with reduction of the forest to a rather limited relic in an area of poor weather conditions, with loss of nest-holes through tree-felling, and with a population explosion of the competing Pearly-eyed Thrasher reducing existing sites and preventing the possible provision of new ones, plus a population now so small that capture for captive breeding is difficult, the species is in a very bad position.

* * *

Mrs. Marsault, who recorded in the magazine in 1969 egg-laying and incubation by her Guillemots in Devon had further success in 1972 when an egg hatched. Unfortunately she was ill at the time and unable to give the young one special attention and it lived only for five days. It is, I think, the only hatching of an auk in captivity on this side of the Atlantic. In the U.S.A. they had a more complete success with the breeding of the Tufted Puffin at the New York Zoological Park in 1970.

* * *

Apart from Albie the Albatross whose life in a zoo was recorded in the magazine a few years ago, the procellariiform birds are more unlikely as avicultural possibilities than are the auks. In the Ibis for 1972 David Wingate describes how he hand-reared an orphan of the near-extinct Bermuda Cahow Petrel, feeding it on a mush of squid and shrimps (both apparently available in frozen form from the local supermarket in Bermuda)

forced down the young birds throat with a squeezeable ketchup bottle. He had the satisfaction of rearing it successfully and seeing it take off for sea with other young.

* * *

My only acquaintance with these birds in captivity was when I visited Miss C. A. Nicholls at Perth, Western Australia in 1966. She tended wrecked or injured sea-birds as well as other casualties. A large suburban-type garden had, in addition to other occupants such as an Australian Magpie with a fondness for attacking bare toes in sandals, two young Giant Petrels wandering among the shrubs, having been kept for over a year and a Black-browed Albatross with an eye injury sitting on the lawn. In a wire-netting aviary were several Slender-billed Shearwaters and a pair of these had actually burrowed and laid an egg. I believe that this last constitutes an avicultural record at present.

* * *

I was pleased to see that accounts of first breedings recently included, as well as records of the rare and difficult, the apparently first breedings of a waxbill species and one of the commoner bunting. There seems to be a general assumption that if a bird is relatively expensive and fairly easily obtained then it must have been bred in captivity and everything about it must already be known. The first is very often untrue, the second almost always untrue.

* * *

The latest number of "Captive breedings of diurnal birds of prey" by the British Falconer's Club and the Hawk Trust records, inter alia, the breeding of the Sparrowhawk, *Accipiter nisus*, in Devon in 1971 and 1972 by Dr. L. H. Hurrell. Single young were reared in each instance. The Hawk Trust also records the breeding of a Caracara after eggs had been laid in two earlier seasons. This is presumably the Crested Caracara, *Polyborus plancus*, although the species is not stated.

* * *

We have heard from Mr. Bertagnolio that the Council of the Italian League against the Destruction of Birds is attempting to reintroduce the Egyptian Vulture which has disappeared from most of Italy except the extreme southern tip and on Sicily. A captive breeding programme is being started with four birds. Mr. Bertagnolio comments that they had earlier hoped to do a similar project with Eagle-Owls but had been unable to obtain birds from reputable sources.

* * *

Readers of the magazine will probably have noticed that in articles dealing with the behaviour of aviary birds, and particularly with regard to waxbills, there is often some reference to Desmond Morris's writings on the subject. Mr. R. U. Lambert has written pointing out that a number of these very interesting, if at times a little technical, studies by Dr. Morris

have been brought together in the latter's book " Patterns of reproductive behaviour " originally published by Cape but now available in paperback by Panther Books.

* * *

Among breeding of native species last year two exceptional occurrences, although not a first, were the breeding of the Nightingale by Frank Meaden and Mick Barber. Since the last documented breeding seems to have been in 1851 it is good to have news of more recent success.

C. J. O. H.

* * *

COUNCIL MEETINGS

A Council Meeting was held on 27th September, 1972, at the Linnean Society.

The following members were present:

Miss Phyllis Barclay-Smith (Vice-President) in the Chair.

Dr. Jean Delacour, Mr. M. D. England, Dr. C. J. O. Harrison, Mr. F. E. B. Johnson, Mr. K. A. Norris, Mr. P. J. Olney, Mr. C. Payne.

Mr. H. J. Horswell (Hon. Secretary), Mrs. Mary Haynes (Assistant Hon. Secretary).

ELECTIONS

Following the resignation of Mr. A. A. Prestwich as President of the Society, Dr. Jean Delacour was unanimously elected to fill this office and was pleased to accept.

* * *

A Council Meeting was held on 21st February, 1973 at 20 Bourdon Street, London, W.1.

The following members were present:

Miss Phyllis Barclay-Smith (Vice-President) in the Chair.

Mr. J. O. D'Eath, Mr. M. D. England, Dr. C. J. O. Harrison, Mr. K. A. Norris, Mr. P. J. S. Olney, Mr. C. M. Payne, Mr. D. H. S. Risdon, Mr. J. J. Yealland.

Mr. H. J. Horswell (Hon. Secretary and Treasurer), Mrs. M. Haynes (Hon. Asst. Secretary).

THE PRESIDENT'S MEDAL

Council was pleased to award the President's Medal to Mr. Walter Van den bergh, Director of Antwerp Zoo for his contribution to Aviculture in connection with the Congo Peacock.

THE SOCIETY'S MEDAL

The Society's Medal was awarded to:

Mrs. N. Howard for the first breeding of the Hawk-headed Parrot (*Derophtyus accipitrinus*), 1973.

R. W. Phipps for the first breeding of the Blue-streaked Lory (*Eos reticulata*), 1973.

CERTIFICATE OF MERIT

The Society's Certificate of Merit was awarded to:

Winged World (B. S. Ward) for the first breeding of the Toucan Barbet (*Semnornis ramphastimus*), 1973.

ELECTIONS

Mr. D. Risdon was elected to serve as Vice-President. Miss P. Barclay-Smith, Sir J. McCullagh and Mr. G. S. Mottershead were re-elected for a further term of office as Vice-Presidents.

COUNCIL MEMBERS

The following were elected to serve as Council members:

Mr. P. B. Brown, Mr. F. Meaden, Mr. H. Murray, Mr. R. Sawyer, Mr. Newton R. Steel, Mr. W. Timmis.

H. J. HORSWELL,

Hon. Secretary and Treasurer.

* * *

BRITISH AVICULTURISTS' CLUB

The one hundred and eighth meeting of the Club was held at the Windsor Hotel, Lancaster Gate, London, W.2. on 8th February, 1973, following a dinner at 7.30 p.m.

Chairman: K. A. Norris.

Members of the Club present: R. A. Chester, R. A. Copley, Mrs. W. Duggan, M. D. Coulter, Miss Ruth Ezra, M. D. England, R. H. Grantham, Dr. C. J. O. Harrison, R. T. Harvey, Mrs. M. Haynes, L. W. Hill, H. J. Horswell, E. F. Housden, C. Jackson, B. F. Jones, J. Kuttner, R. Kyme, H. Kenyon, F. Meaden, Neil O'Connor, Mr. and Mrs. W. Page, B. Sayers, Mr. and Mrs. G. Schomberg, R. Sawyer, Newton R. Steel.

Members of the Club present, 28; guests 27.

Members of the Club very much enjoyed a most interesting talk by Mr. Derrick England, entitled "An Aviculturist Around the World with a Camera", which was illustrated by superb coloured slides of birds taken in the course of his travels.

MARY HAYNES,
Hon. Secretary.

NOTICE

BREEDING OF THE BLUE-BACKED MANAKIN AT THE
LONDON ZOO

The Editor apologises to Mr. J. P. J. Olney that the usual note regarding a first breeding was not appended to his article on "Breeding the Blue-backed Manakin *Chiroxiphia pareola* at London Zoo". Published in the January/February number of the Magazine—pages 5-7.

It is believed that the breeding of the Blue-backed Manakin may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Assistant Editor.

The AVICULTURAL MAGAZINE is distributed by Taylor & Francis Ltd., 10-14 Macklin Street, London, WC2B 5NF, to whom members should address all orders for extra copies and back numbers. Subscriptions and back number orders from non-members should also be sent to Taylor & Francis Ltd. The subscription rate, payable in advance, is £3.00 (U.S.A., \$7.50) per year, and the price for individual numbers is 63p (\$1.50) per copy.

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CHANGES OF ADDRESS

- A. BOOTH, 2nd/Stwd., to M.V. Trebartha, P & O. General Cargo Division, Beaufort House, St. Botolph Street, London, EC3 A 7DX.
- A. H. BROOKING, to Longacre, Benton's Dial Post, Sussex.
- A. HANSEN, to Torslundevej 117, D.K. 2630, Taastrop, Denmark.
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- B. LIAUZU, to Parc Zoologique, "Les Demevers", St. Pourcain, S/Besbre 03, France.
- A. PLATT, to 264 Beacon Road, Wibsey, Bradford 6, Yorkshire.
- C. G. ROOTS, to Assiniboine Park Zoo 2355, Corydon Avenue, Winnipeg, Manitoba R3P0R5, Canada.
- W. VANDEVIJVER, to Golfaan 19, 9830 St. Martens-Latem, Belgium.
- A. L. WHEELER, to 700 Fern 14, McAllen, Texas 78501, U.S.A.

NEW MEMBERS

The 53 Candidates for Membership in the January-February 1973 number of the AVICULTURAL MAGAZINE were duly elected members of the Society.

CANDIDATES FOR MEMBERSHIP

- A. F. ALPIN, Donaldsons School for the Deaf (Senior Dept.), West Coats, Edinburgh, Scotland.
- B. D. BENDING, 8, Joan Court, Noble Park, Victoria 3174, Australia.
- BENGT JOHANSSON, Rödalidsvägen 4, S-417 28, Gothenburg, Sweden. Proposed by T. Brosset.
- R. V. BERRY, 15 Colindale Park, Dunmurry, Co. Antrim, N. Ireland. Proposed by R. L. Henshaw.
- J. BICKELL, Ostrich House, Burnham Overby, Kings Lynn, Norfolk. Proposed by R. Kyme.
- F. V. FREY, The Canary Bird Farm, Englishtown Road, Oldbridge, N.J. 08857, U.S.A. Proposed by A. L. Tyler.
- H. GRUNENBERG, P.O. Box 638, Panguna-Bougainville, New Guinea.
- MRS. R. M. HALE, 178, Parkwood Road, West Islip, New York 11795, U.S.A. Proposed by R. B. Stewart.
- W. J. HILL, 4901 Phinney Avenue North, Apartment 303, Seattle, Washington 98103, U.S.A.
- H. LEWIS, Orchard Cottage, Heaselands, Haywards Heath, Sussex. Proposed by R. Kyme.
- T. LUNDSTROM, PL. 394, Mannarp S-310 40, Harplinge, Sweden. Proposed by T. Brosset.
- N. J. MUNDEN, Qnarr, Bridge Road, Cranleigh, Surrey. Proposed by Mr. Norris.
- G. PETCH, Ridgeland, Ridge Road, Kalorama Victoria, Australia.
- MR. PICKERING, 41 Lumley Avenue, Skegness, Lincolnshire. Proposed by R. Kyme.
- J. PRESCOTT, 6, Goore Avenue, Sheffield, S949E. Proposed by R. A. Harper.
- J. RICHARDS, 32, East Street, Warminster, Wilts. Proposed by R. Kyme.
- E. G. B. SHULTE, Floralaan West 272, Eindhoven, Holland.
- R. W. STODDART, 163 Flatts Lane, Normanby, Middlesborough, Teeside TS6 0DD.

CORRECTION

MR. D. GAINY, Milton Cottage, Lower Street, **Eastry** not Gastry, Nr. Sandwich, Kent.

DONATIONS (Colour Plate Fund)

The Council wishes to thank the following Members for their donations to the Colour Plate Fund

J. Delacour
W. Duggan
W. A. Howe
Dr. J. Ingels
Klaus-G Mau
R. Nelson

Dr. H. S. Raethel
S. Rognlien
Dr. L. A. Swaenepoel
J. D. Willmott
E. De Winter

Will Members please donate their surplus books on birds to the Society for the benefit of the Colour Plate Fund.

URGENT—SUBSCRIPTION REMINDER

Subscriptions for 1973 were due on 1st January. Members who have not already renewed their Membership are asked to do so immediately to ensure receipt of the next Magazine.

Hon. Secretary & Treasurer.

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AVICULTURAL MAGAZINE



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THE AVICULTURAL SOCIETY

Founded 1894

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Hon. Secretary and Treasurer: Harry J. Horswell, 20 Bourdon Street, London, W1X 9HX

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Miss P. Barclay-Smith, C.B.E., 5 Eton Avenue, London, NW3 3EL
Dr. Colin Harrison, 22 St. Margaret's Close, Berkhamsted, Herts.



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Long-tailed Tits, *Aegithalos caudatus* showing variations in the head markings of *A.c. rosaceus* [Derek Washington

AVICULTURAL MAGAZINE

THE JOURNAL OF THE AVICULTURAL SOCIETY

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MAY-JUNE 1973

THE LONG-TAILED TIT

By C. J. O. HARRISON (Berkhamsted, Herts., England)

The Long-tailed Tit, *Aegithalos caudatus*, is one of the loveliest of our small, native species. It presents some difficulties as an avicultural subject. It is one of those very small, constantly active species; finding tiny morsels of food on the twigs, branches and leaves of trees and shrubs. It appears to have a high metabolic rate and a need to constantly stoke-up with food, and therefore requires careful provision of food to ensure that it is available when needed and also to ensure that each individual is able to obtain a reasonable share.

Works on ornithology do not suggest any way of sexing this species, but some aviculturists who have had experience in keeping them are of the opinion that they can normally be sexed by comparison of the head markings. On either side of an otherwise pale head a bold dark band of blackish brown extends back over the eye to the nape. In the living bird, this certainly varied between individuals, and the fine photograph by Derek Washington, used as a frontispiece for this number of the magazine, shows a close view of the heads of two young birds, illustrating the extent to which these markings may vary. Birds with broad markings are said to be males, those with narrower markings females. Unfortunately this variation is not apparent to the same extent in museum specimens, possibly as a result of movement of the skin during preparation of preserved specimens and it is not possible to cross-check from this source. In view of the variation in plumage pattern and colour throughout the geographical range it is possible that this sexual difference would only apply to some races.

Another problem for the aviculturist who tries to breed this species is the provision of suitable nest material. One principal constituent, which sticks together the fragments of moss and lichen to form the domed nest of the Long-tailed Tit is fresh spiders' webs. Spiders' webs are a natural material which is usually to hand somewhere in a wild area, but is extremely difficult to supply in adequate quantities in the confines of an aviary, and I have not heard of a really effective and generally available substitute.

It is perhaps a mercy that so few of the birds which we try to keep need this material to bind the nest together. If one examines the breeding of birds in tropical and subtropical regions, it becomes apparent that a surprising number of smaller, insectivorous birds use this material and a basic element for binding and shaping the nest. In such regions spiders tend to be larger and more plentiful and there is likely to be a more adequate supply of bigger and stronger spiders' webs to utilise for this purpose.

ON KEEPING FREE-WINGED WATERFOWL

By J. O. D'EATH (Monken Hadley, Herts, England)

Having eschewed an interest in ornithology at an early age it was in my two closing years at school that my attention became focussed more specifically on aviculture and waterfowl in particular. Thus it was in 1929 that I based the foundations of my collection. It started in a modest way with several Common Shelduck (*Tadorna tadorna*) reared from eggs lifted in the wild on the Somerset coastline. During the passage of time, now some 40 years, the collection grew in size and accommodated as many as 90 different species including some rarities and one derived great pleasure from breeding successes personal or otherwise, but of course disappointment and failure outweighed these as it always will.

I suppose as one grows older one becomes more aesthetic in one's outlook and the appeal of seeing birds at liberty grows stronger.

Therefore in the last few years I have been prompted to experiment with free-wing species. This of course has been done by others before, but the purpose of these notes is to encourage the younger generation of waterfowl keepers to be bold enough to experiment.

I must assume that the governing measure of success must be local habitat and therefore where some may succeed others may fail. It must be obvious that if one's collection for example is geographically situated near attractive wet-land or on a riverine site then losses must occur. I am situated in an urban area and, in spite of this, have been surprised at being able to hold unlikely species. I will now turn to the individual species of birds currently free-winged in the collection and comment on each.

MANDARIN (*Aix galericulata*)

Apart from being one of the most spectacular plumaged of the waterfowl, this species is undoubtedly the most likely to succeed as a free-wing subject. It has of course established itself in the wild in various parts of the United Kingdom. I have maintained 10/15 pairs here for a number of years and it is an unceasing delight to see these birds flight in and land at one's feet at feeding time. In Spring I derive the greatest pleasure from seeing the Mandarin pairs prospecting for nesting sites sometimes 60 ft. up in tall trees. The late J. C. Laidlay established a similar colony in his small garden on the banks of the Tay in Perth, Scotland and here even today as many as forty Mandarin may be seen fighting in to two very small concrete pools. They also return to nest in boxes put out for them. Of the Mandarin I rear each year, I usually release about five pairs to maintain the stock. By no means all the free-wing birds nest on the property and it is usually not until the beginning of October that one

sees birds reared by their parents coming into to feed. Mandarins are very fond of acorns and may be the presence of a good number of Oaks here has some bearing on their autumnal showing.

CAROLINA (*Aix sponsa*)

A similar bird in its habits to the Mandarin but not quite so successful in my opinion. Its flight is low and undoubtedly it does not propagate itself so freely in the wild, hence one has to continually rear and release young birds to maintain the stock. Nevertheless they would appear to be good stayers.

MANED GOOSE (*Chenonetta jubata*)

Supposedly allied to the above in science and another suitable subject for liberty. I started with an unpinioned male paired to a pinioned female and have progressed from there. These birds are very confiding and tame by nature and it is nice to see them sitting on gate-posts on the wire perimeter fence and not taking wing till one almost touches them. A fellow aviculturist in Essex who had some of my original stock now has a sizeable free-wing colony. My Maned Geese do not seem to be so arboreal in the habits as the Mandarin and Carolina, but as already mentioned use gate posts and fences for perching.

CHILI PINTAIL (*Anas georgica spinicauda*)

At one time after the War, this species was a rare one in collections and I well remember obtaining the first two pairs to come into a private collection from a Dutch dealer. Since those early days they have been freely bred and have now reached the stage where they are difficult to sell. However, on the credit side of the balance, I have found them excellent subjects at liberty and they visit the various small ponds in turn. For the first time this year a pair bred away and returned in July with four fully grown young which were caught and ringed with Avicultural Society rings. My stock are extremely tame and it is sometimes difficult to deliberately get them on wing.

EIDER (*Somateria mollissima*)

For many years now, I have made a point of not pinioning this species, but to be honest not for the purpose of maintaining a liberty stock. The Eider in captivity is a gross feeder and becomes overweight and if getting on wing has difficulty in maintaining altitude. I always have 7/8 adult pairs and in the last 20 years have experienced only two losses (one recovered). In both cases these were females, the latter bearing an Avicultural Society ring was recovered about 10 miles away. The other did not return. They will occasionally fly the width of the pond, more particularly in Spring.

RED-BILL WHISTLING DUCK (*Dendrocygna autumnalis autumnalis*)

This is an ideal free-wing subject and over the years according to breeding success I have always had a small number of this species at liberty. They are exceedingly tame and tree-perching, and with me never wander beyond the confines of the collection. I have likewise had the individual Fulvous (*D. bicolor*) under the same conditions. If my memory serves me right I recall a small flock of White-faced Whistlers free-winged at the famous Walcot Hall collection of Messrs. R. & N. Stevens before World War II. I think the whole family Dendrocygnae are very suitable subjects for liberty birds.

COMMON TEAL (*Anas crecca crecca*)

I would not say that this species is guaranteed to stay, but I have enjoyed reasonable success and currently have two males which have been in the collection for five years but which do disappear for brief periods.

BARNACLE GEESE (*Branta leucopsis*)

For some reason this species breeds well in the collection and I have annually liberated 6/12 birds. I think the main basis to start is to have a free-wing gander paired to a breeding female. The ensuent family will then usually stay together. One can then carry it a stage farther by feather-clipping one or two of the brood for the first year. At one time I had a small flock of 12 on wing for 3 years and when they finally decided to leave they appropriately moved to the Wildfowl Trust at Slimbridge and joined the wild White-fronts, causing some consternation and head-scratching among the experts who were baffled by the sudden extension of the Barnacles known range in the British Isles. Owing to lack of space I have not experimented with other species of geese, but in larger collections such as Slimbridge and elsewhere a greater variety of geese have been successfully kept at liberty over the years.

COMMON SHELDUCK (*Tadorna tadorna*)

Although frowned upon by most Waterfowl keepers as a common bird, this species is undoubtedly one of the most colourful of our native birds. Here again a start was made by pairing a free-wing male to a pinioned duck. Being a marine duck I was extremely sceptical of success, thinking that the call of the sea would prove too much. However, this was not the case and I now have five birds on the wing. It is interesting to note that whilst in their natural habitat of the shore-line they have no obstacles to negotiate and here they have to negotiate tall trees to effect a landing and they accomplish this with far greater expertise than wild Mallard.

KNOBNOSE GOOSE or COMB DUCK (*Sarkidiornis melanotos melanotos*)

About five years ago I reared a number of these birds, the female laying 13 eggs in her first clutch. From the surplus undisposed of I retained a pair unpinioned, which were feather-clipped their first year.

These have successfully stayed ever since and it is interesting to note that they always fly independently and not together. The male, however, does make far-ranging flights off the property and is sometimes away for hours at a time. It is always with a sigh of relief when I see him safely back again within the confines of the collection. I was anticipating that they might breed away from the property like some of the Mandarin but so far this has not occurred.

SUMMARY

As I mentioned initially, the foregoing notes are intended to encourage waterfowl keepers to experiment on similar modest lines to myself and I am sure the great pleasure they derive from any success achieved will be an ample reward. There are obviously numerous other species which would be suitable subjects for experiment and this can only be ascertained on a "trial and error" principle. The free-wing plan can sometimes operate on a reverse "lease-lend" basis and I have from time to time had wild birds fly in and pair to pinioned females. Recently this Spring, a male Shoveller (*Spatula clypeata*) has arrived and paired to a female in the collection and similar instances with European Teal and Tufted Duck have occurred in the past.

* * *

PLUMAGE PATTERN IN THE BUFF VARIETIES OF THE HOUSE SPARROW AND THE PAINTED QUAIL

By C. J. O. HARRISON (Berkhamsted, Herts., England)

I recently had the opportunity to observe a number of individuals of a buff strain of the House Sparrow, *Passer domesticus*, bred by Mr. T. Dooley, and through the kindness of Mr. John Dowling have received specimens of the buff variety of the Painted Quail, *Excalfactoria chinensis*. In referring to a buff variety I mean the non-eumelanic variant in which black melanin pigment is usually absent from the plumage. These two forms are of special interest, because of the extent to which not only the chestnut-red melanin but also some black-pigmented signal elements of the normal male plumage pattern are retained.

In the sparrows the females appear a light, buffy-brown. The males retain in addition the broad chestnut-red band across the side of the head and similar colour on the wings and the mantle. They also have a black throat patch present to some degree, and in most individuals some black colour is also present on the lores. One or two of the birds seen showed more extensive dark markings on the head.

This retention of marking is even more apparent in the Painted Quail. The female of this species shows typical loss of black markings in the buff variant, the plumage being buff and brown with whitish patches where the

black marks would normally appear on feathers. These pale areas were not wholly white on the specimens examined but showed a greyish-blue tint. This might be due to the retention of very small quantities of eumelanin thinly dispersed within the feather, but might alternatively be caused by the reflection of light from an unpigmented feather structure, since in some non-eumelanic varieties of pigeons the unpigmented feather areas have a bluish-grey tint for this reason.

The chestnut-red pigment present in small quantities, tinting the throat, eyestripe and pale streaks of the back, and present to varying degrees elsewhere in the plumage, is retained in the variant female. Dark markings such as the ventral barring in the typical form are due to a combination of both brown and black pigment, and although the black is lost in the variant form, similar markings in brown are still present. The loss of colour is most apparent on the flight feathers and primary coverts of the wings which are almost white. The bill is still black and there is no suggestion of loss of pigment other than in the plumage.

The male quail shows a similar loss of black markings to that of the female, where the dorsal plumage and wings are concerned. The head and mantle show a series of rows of small greyish-white spots replacing black marks, but the mottling is less apparent on the back which appears mainly chestnut-red with paler longitudinal streakings. The most striking feature is that the entire ventral plumage pattern, including the chestnut-red of belly and under tail coverts, and the slate-blue of breast, flanks forehead and tertials, is retained, apparently unchanged. Apart from a slight loss of black, producing a dark brownish-black, the bold facial pattern is also retained. One would not immediately associate this variation with the other non-eumelanic forms.

In both these species therefore a variant form occurs in which black pigment is usually completely lost but in these instances is retained in some signal markings of the male. Since there is some individual variation it might be argued that the change is produced by a gene of incomplete penetrance and that the presence of these markings merely reflects the failure of the gene to achieve its full effect.

There is, however, evidence from variant plumages in the Zebra Finch, *Taeniopygia guttata*, such as the "penguin" variety, indicating that the bold black breast pattern characteristic of the male may be under separate genetic control from the remainder of the pattern and that its presence or absence may occur without affecting the remaining plumage pattern. In the House Sparrow and Painted Quail the markings that are retained in the buff variant are conspicuous markings characteristic of the species and sex. It therefore seems possible that this might be a parallel case to that of the Zebra Finch and that these markings also might be under separate genetic control from the rest of the plumage and not immediately affected by a genetic change which otherwise has a modifying effect on the plumage in general.

BREEDING SCHALOW'S TOURACOS AT THE JERSEY WILDLIFE PRESERVATION TRUST

(*Tauraco schalowi*)

By D. GRENVILLE ROLES (Deputy Curator of Birds)

DISTRIBUTION

Found in suitable localities throughout Angola, Botswana, Zambia, Rhodesia and the Southern Congo, our pair of *Tauraco schalowi* (Reichenow) came from the vicinity of Luanda in Angola. The male arrived in August 1966, the female in May 1971.

DESCRIPTION

Equal to a small pigeon in size but with a long fan-shaped tail and long pointed crest, these touracos have the typically beautiful plumage and striking appearance of the "forest-dwelling" species, with light green head, neck and breast, sooty black underparts and rump and iridescent emerald and violet-blue back and wing coverts. The tail is entirely violet-blue and the flight feathers are brilliant crimson. The bill and eye-wattle are coral red with a short white stripe in front of and a long white stripe below the large brown eyes. Legs and feet are black.

ACCOMMODATION

The aviary is approximately 20 ft. \times 8 ft. \times 6 ft. high with a shelter 15 ft. \times 8 ft. \times 9 ft. high at the rear of the flight, a nest pan 7 ins. \times 10 ins. of weldmesh covered by hessian and with a 1½ ins. \times ½ in. wooden rim, is fixed about 1 ft. from the ceiling in a dark corner of the shelter.

The flight floor is covered with a deep layer of sand over gravel, the shelter floor is covered with sawdust. The flight is planted with flowering currant *Ribes sanguineum* and *Cupressus macrocarpa*.

Sharing the aviary are a pair of Blue Eared Pheasants *Crossoptilon auritum* whom the Touracos ignore; neighbours are a pair of Grey Touracos *Corythaixodies c. concolor* with whom *Tauraco schalowi* bicker, and on the other side a breeding pair of Keas (separated by double mesh of course), who are also ignored.

PAIRING AND BREEDING

Shortly after her clearance from quarantine and a brief period in a very large aviary, the female escaped through a previously unnoticed hole in the wire netting. She remained at liberty for 6 months, feeding (from telephoned reports within a ½ mile radius of the Zoo) upon apples, blackcurrants, blackberries, elderberries and hawthorn berries. Eventually she was recaptured in excellent condition, in a cat-trap baited with orange. She was frequently heard and seen in the Zoo grounds and

provided an exotic spectacle when seen flying between groups of trees. During this period she was seen to visit a solitary individual of her species and "bill" with it through the wire in a very friendly fashion, but persistently attacked a (believed) pair of *Tauraco schalowi* in the aviary next door but one to the single bird.

On her recapture she was placed with the single specimen, who after a minutes chase, inspection, and domination, accepted her.

The birds' relationship went from strength to strength and the male, (as he was to prove himself) was seen feeding the female, who solicited this action by juvenile wing fluttering and gaping. No recognizable form of courtship was observed though when one unexpectedly alighted beside the other they would "bill", shaking their heads from side to side and "flashing" their facial pattern, while both uttering a staccato grumble.

Mating was never observed and no form of nest building was seen to take place, the first dull white egg being laid on the 13th April, 1972 in the totally unadorned nest platform. A second egg was laid on the 15th April. One of these was found smashed at the end of the flight furthest from the nest on the 20th April, the remaining egg disappeared on the 9th May.

The eggs of the second clutch were laid on the 24th and 26th May, both eggs hatching on 16th June.

The development of the chicks has been tabled below for comparison with the development of the two other species of Touraco, whose chicks we have successfully reared. The data in each case refer to the first successfully reared brood.

Both chicks described are now fully grown and in apparently perfect health.

As described above, Schalow's Touraco, *Tauraco schalowi* has been bred at the Jersey Wildlife Preservation Trust. It is believed that this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is required to communicate at once with the Assistant Editor.

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TOURACO DEVELOPMENT—A COMPARISON BETWEEN THREE SPECIES REARED AT THE
JERSEY WILDLIFE PRESERVATION TRUST

DATA	SCHALOW'S TOURACO <i>Tauraco schalowi</i>	GREY TOURACO <i>Corythaixoides c. concolor</i>	GOLD-COAST TOURACO <i>Tauracus p. persa</i>
Incubation and number of chicks	1st egg laid 24th May, 1972. Hatched 16th June, 1972. 2nd egg laid 26th May, 1972. Hatched 16th June, 1972. Two chicks hatched together. Incubation of 22 and 20 days.	1st egg laid 1st May, 1970. Hatched 29th May, 1970. 2nd egg laid 3rd May, 1970. Hatched 29th May, 1970. 3rd egg laid 5th May, 1970. 31st May, 1970. Three chicks hatched over 2 days. Incubation varied from 29 to 26 days.	1st egg laid 7th July, 1970. Hatched 28th July, 1970. One chick. Incubation took 21 days.
Day old: Weight Length Description	14 gms. 3.3 in. Very pale flesh covered with black down, bill pink with black tip, inside of mouth bright pink, legs pinkish grey with black claws. White claws on alula.	14½ gms. 3.0 in. Pink flesh covered with charcoal grey down, bill pink with dark grey tip, inside of mouth bright pink, feet grey. Eyes opaque blue grey. White claws on alula.	18 gms. 3.7 in. Pink flesh sparsely covered with black down, bill pink, front of upper mandible black, bright pink inside mouth. Legs greyish pink. White claws on alula.
Development at	8 days—Bill orange-pink. Backs of both chicks look partially plucked and reddish. 10 days—Pinfeathers ¼ in. long visible on wings of both chicks. 17 days—Chicks believed to be receiving pheasant breeders pellets. Crest feathers coming through on both specimens, now an appreciable size difference between them. 24 days—Red area on wings of larger chick.	10 days—Weight 71 gms. Diet on examination of regurgitated pellets consists of: soaked raisins, boiled egg, convolvulus and hawthorn leaves. 15 days—Chicks clambering about on branches next to nest. 17 days—Chicks being fed on banana. 18 days—All chicks have left nest.	12 days—Chick covered with thick black down. Pin feathers approximately ⅜ in. Long visible on wings and tail. Bill tip black, remainder of bill and facial skin white. Eye black. Rearing food so far mainly raisins, banana and mealworms. 21 days—Chick spent first night away from nest, very agile though cannot yet fly. Plumage is entirely black; purple gloss on flight feathers.

(Continued on next page)

TOURACO DEVELOPMENT—A COMPARISON BETWEEN THREE SPECIES REARED AT THE
JERSEY WILDLIFE PRESERVATION TRUST

(Continued from page 77)

DATA	SCHALOW'S TOURACO <i>Tauraco schalowi</i>	GREY TOURACO <i>Corythaixoides c. concolor</i>	GOLD-COAST TOURACO <i>Tauracus p. persa</i>
Development at	<p>25 <i>days</i>—Larger chick out of nest (first time).</p> <p>28 <i>days</i>—Second chick <i>seen</i> out of nest for first time.</p> <p>29 <i>days</i>—Green plumage coming through on the backs of both chicks. Both now moving strongly around inside quarters, 43 <i>days</i>—Chicks feeding themselves.</p> <p>53 <i>days</i>—Chicks separated from the parents. Great difference in size between them.</p>	<p>33 <i>days</i>—Chicks eating hawthorn leaves.</p> <p>35 <i>days</i>—Chicks eating whole orange.</p> <p>41 <i>days</i>—Chick begging food from adult.</p> <p>45 <i>days</i>—Alarm call attempted by chick.</p> <p>47 <i>days</i>—Chicks now self-supporting, removed from parents aviary.</p>	<p>25 <i>days</i>—Crimson on flight feathers just starting to show. Crest quills about $\frac{3}{16}$ in. long. Coloured nodules appearing around eyes. Iris becoming lighter.</p> <p>43 <i>days</i>—Bill becoming lighter, eye still very dark—green plumage coming through. Eye wattle very dark red.</p> <p>102 <i>days</i>—Bill blackish red, eye wattle dull red, eye still darker than adult. Lower white eye stripe not as pronounced as in adult—has adult greater wing coverts. Has moulted out half of juvenile flight feathers. Green area on back not so great as that of adults.</p>

NOTES ON THE TOURMALINE SUNANGEL HUMMINGBIRD

By A. J. MOBBS (Walsall, England)

The Tourmaline Sunangel, *Heliangelus exortis*, can be found in the temperate zone of the Western and Central Andes, subtropical zone of the Eastern Andes of Colombia and of Eastern Ecuador (Peters 1945).

The male is a predominantly dark green bird. The upper parts are not iridescent, the feathers do have a shine to them, however. The chest and forehead are iridescent; chin and upper throat glittering violet-blue; lower throat glittering red, appearing as pink in certain lights. The tail which is long and deeply forked, has outer feathers of black and the central pair bronzy green. The primaries are also deep black. The vent and undertail coverts are white (adding greatly to the beauty of this species); there are also white ocular patches.

The female is also a dark green bird with a white chin and throat. The tail is shorter than in the male and not so deeply forked.

The male in my collection, is one of the few hummingbirds I have purchased which has not been a new import. It had in fact been in the country 17 months before it came into my possession. I first saw this bird at my importer-friend's establishment, where it was housed with an assorted batch of hummers, newly arrived from Ecuador. As well as this male, there were two other males and one female.

Although I was very taken with the species, all the Sunangels in the consignment appeared to be extremely belligerent and because of this, I decided against purchasing one.

The male which is now in my collection, was originally sold to a person who housed it in a cage in his lounge. These conditions were far from ideal, partly because the bird received no live food. As this was the only bird owned by this person at the time, he soon grew tired of it and eventually it was sold to a friend who kept a mixed collection of exotics, which included two or three hummingbirds. It was from this person that I acquired the Sunangel.

I have given a brief history of the bird in question, mainly because the species is considered by many to be a difficult one to keep alive in confinement for any length of time. In fact of the four which originally came in, the male now in my collection is the sole survivor.

A friend of mine who is usually most successful with hummingbirds, has had no luck with this species. The first Sunangel he acquired, died within two months, the second and third died within a matter of days. All were in seemingly good health at the time of death. Other friends of mine have had reasonable success with this species, but none of the birds have lived more than four months, even when housed under seemingly ideal conditions. It is therefore, all the more surprising that the male now



Sketch of Male Tourmaline Sunangel when first purchased, showing abnormal colouring of white primaries and white patches on tail feathers, resulting from incorrect feeding.

in my collection, survived when the conditions in which it was housed could not be classed as suitable for even the most robust of hummingbird species. There is a possibility that this male holds the longevity record for the species in this country.

When I purchased the Sunangel, most of its primaries were white or near white. There were also white patches in the outer tail feathers. I put this down to the bird receiving little or no live food during the period of the moult. As it happened, I purchased the bird just at the right moment, as within twelve days it had commenced to moult. In hummingbirds, it is usually the primaries which are the first to go and as I had had this bird so short a time, I would not have been surprised if the first feathers to be shed had grown in abnormally coloured. I always have an abundance of fruit-flies and the Sunangel took these avidly the moment it was released into my communal hummingbird flight. This moult took ten weeks and when completed, the birds' plumage was immaculate and was the correct colour throughout.

This bird has continued to take large numbers of fruit-flies each day and has proved to be the most insectivorous species I have so far owned.

I have mentioned earlier that this species can be most belligerent. Other hummingbird enthusiasts who have owned Sunangels, will I feel sure, be in agreement with this. It was therefore with some perturbation that I released the Sunangel into my hummingbird flight. The bird was obviously not in the best of health as not only had it moulted incorrectly, it was also very much underweight. Perhaps this helped somewhat with the introduction to the flight, even so the Sunangel did show aggression to certain species. Two birds which helped keep the Sunangel "in its place" was a male Velvet-purple Coronet, *Boissonneaua jardini*, and a male Sapphire-vented Puffleg, *Eriocnemis luciani*. The former would most probably have ignored the Sunangel but for its abnormal plumage. This presumption is based on the fact that the Coronet attacked the Sunangel only when the latter was flying. At such times, the Sunangel showed large areas of white against what was otherwise a predominantly dark green bird. I have been unable to house White-necked Jacobins, *Florisuga mellivora*, or Black Jacobins, *Melanotrochilus fuscus*, with the Coronet, because of the predominantly black and white plumage of these species. Once the Sunangel had shed the white feathering, the Coronet ignored it completely.

The Sapphire-vented Puffleg and the Sunangel disliked each other on sight and will obviously continue to do so for the remainder of their lives. At first the Sunangel, being the newcomer to an already well established collection, was wary of the Puffleg and there were times when I feared the former would have to be removed from the flight. However, over a period of a few months, there developed a pattern of behaviour which appears to satisfy both birds. During the morning period, the Sunangel is the dominant of the two and does on occasions show extreme aggression toward the Puffleg. From around mid-day to 3 p.m. is always a quiet period as most of the hummers are at rest. After this quiet period and up until roosting time (10 p.m.), the Puffleg becomes the dominant character and it is this bird's turn to show extreme aggression towards the Sunangel.

Species from the genera *Helianthus* and *Eriocnemis*, appear to be very much alike in many ways. For example the Tourmaline Sunangel and the Glowing Puffleg, *E. vestitus*, are very similar. Both species being predominantly dark green, with patches of highly iridescent plumage (Perhaps I should point out that this applies to males only; female Sunangels having white in their makeup). The shape of these species is also similar. I mention this as there is a possibility that the aggression shown is due to this similarity. This is most certainly the case where such species as Amazilias and certain species of Sapphires (both *Hylocharis* and *Chrysura*) are concerned.

The Tourmaline Sunangel is extremely vocal (this is where it differs greatly from the *Eriocnemis*, as birds from this genus appear to be silent), and its song can be heard many times throughout the day. The song

consists of one note—Zzzzzt—which is repeated three or four times, when there is a slight pause before the note is again repeated. When showing aggression, the Sunangel uses this same note but it is more harsh, also the beautiful iridescent throat patch is thrust out more than it is during the normal-type song.

During quiet periods this hummer will perch on one leg and puff out its feathers, giving the appearance of being ill. While in this position, it will on occasions, sing a subdued version of the normal-type song. As the bird dozes, so the song is repeated less frequently until eventually the bird becomes silent. It needs only a slight disturbance, however, for the Sunangel to commence singing again.

I have found many species of birds kept in captivity, are encouraged to sing when music or such sounds as boiling kettles or vacuum-cleaners are heard. The sunbirds in my collection sing exuberantly when my wife is using the vacuum-cleaner in the hallway outside the birdroom. I mention this inducement to sing because until I purchased the Sunangel, I had not been aware hummingbirds could also be induced to sing. The Tourmaline Sunangel, although perhaps not so ready to break into song as the sunbirds, nevertheless is induced to sing when hearing prolonged bouts of music, etc. One sound in particular which never fails to persuade this hummer to sing is that of a scrubbing brush being run over the wire-mesh of the flight.

In a letter which appeared in the correspondence column of this magazine (1971), I gave a list of hummingbird species which I had observed indulging the habit of resting on one foot. This list did not include the *Heliangelus*, as at the time I had not owned a member of this genus. After careful observation of the male *exortis* in my collection, and through correspondence with other hummingbird enthusiasts, I feel it is safe to say the Tourmaline Sunangel spends more time resting on one foot than any other species I have so far studied.

Although either foot can be used for gripping the perch, it appears the right foot is the most favoured. As with the *Boissonneaua*, I have yet to see the Sunangel actually roosting while gripping the perch with one foot.

With certain species of hummingbirds, it is often difficult to decide where aggressive attitudes end and mating display begins. This is particularly so with the Tourmaline Sunangel. As already mentioned, when showing aggression this species does utter a more harsh note than in the normal-type song, also the throat-patch is more pronounced. When showing aggression, the bird will hold its body sideways along the perch, with the wings hanging loosely to the sides and the tail feathers fanned. If this show of aggression is not enough to route the bird at which it is being directed, the Sunangel will become most agitated and will leave the perch and bombard its unfortunate "victim" from all directions. The Sunangel will on occasions force, its "victim" to leave the perch by pecking at its vent.

As mentioned, the mating display of the Sunangel is very much the same as the aggressive display. There is a possibility, however, that I do not witness the entire mating display of this species, as although my hummingbird flight is 18 ft. long, it is only 2 ft. 6 ins. wide, and this could limit the bird's actions somewhat.

The pronounced wing-action of this species is used each time the bird alights. Although not so exaggerated as that of the Coronet Hummingbirds (Mobbs 1972), this wing-action is nevertheless most noticeable. The Coronets hold their wings erect each time they alight; the wings are then brought down abruptly and folded into the resting position. The Sunangels, upon alighting, hold their wings horizontal and move them two or three times before folding them into the resting position. This action is more leisurely than it is in the Coronets and the wings are held much more loosely.

The wing-action of the Tourmaline Sunangel is very much in evidence prior to the mating display. At such times the bird will continually flick its wings, it will also open and close its tail feathers continually.

Until I purchased the Sunangel, I had always looked upon the Sapphire-vented Puffleg as being the most prolific bather of the hummingbird species I had so far owned. I now consider the Sunangel to be equally as fond of bathing—yet another similarity between the species. As well as taking at least five or six baths daily, the Sunangel also drinks a certain amount of water. In fact each morning as soon as the birdroom lights are turned on, the Sunangel goes down to the bathing saucers to drink *before* taking nectar. It can be seen taking water from these saucers many times throughout the day also. Many hummingbird species take water regularly, but I have witnessed the following species only, take water *before* nectar each morning: Sapphire-vented Puffleg, Glowing Puffleg and Rainbow-bearded Thornbill, *Chalcostigma herrani*.

ACKNOWLEDGEMENT

I would like to thank Ber van Perlo (Odijk, Holland), for the sketch of the Tourmaline Sunangel.

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BREEDING FLAMINGOS AT SLIMBRIDGE

By T. S. JOHNSTONE (Stroud, Glos., England)

Aviculturally perhaps the greatest success at Slimbridge during the last decade has been with the flamingos.

Before the first birds arrived, I was given the opportunity to visit those establishments in Europe and America that had been successful in breeding flamingos. My object was to gain information about their husbandry particularly with regard to their diet, environment and colour preservation. With this information, a lot of uncanny 'knowhow' from the Hon. Director, and a deal of experiment a system was evolved.

Starting with twenty Chilean Flamingos in 1961, the number was in the autumn of 1972 over three hundred birds of all six forms as follows:—

41 Greater flamingos (<i>Phoenicopterus ruber roseus</i>)	12 reared at N.Gds.
63 Rosy flamingos (<i>Phoenicopterus ruber ruber</i>)	8 reared at N.Gds.
122 Chilean flamingos (<i>Phoenicopterus chilensis</i>)	55 reared at N.Gds.
22 Andean flamingos (<i>Phoenicoparrus andinus</i>)	2 reared at N.Gds.
19 James flamingos (<i>Phoenicoparrus jamesi</i>)	
45 Lesser flamingos (<i>Phoeniconaias minor</i>)	

The first breeding was that of the Caribbean in 1969 and since that time 77 young of four forms have been reared. The only species that has yet to lay is the James's.

The object of the exercise was to keep as large flocks as possible in as extensive surroundings as possible and to maintain the birds natural colour. We felt that these factors together with suitable winter quarters, might well result in breeding flamingos for the first time in Great Britain.

The diet eventually evolved is a meal made up by milling equal quantities of wheat, maize, poultry biscuit, turkey starter crumbs, dried shrimp and fish meal. The meal is mixed with water to a consistency of a thick soup. Minced lettuce, carrot and beetroot are added when available and the soup is medicated with Tylan as a precaution against respiratory diseases, to which James's Flamingo seems to be particularly prone.

Inasmuch as the breeding pairs of birds have been those in the best colour and that the colour is rapidly lost when the young birds are being fed, it would seem fair to assume that colour preservation in captive flamingos is a factor that facilitates successful breeding. Consequently the effect of various additives to the feed on plumage was examined over the first few years. It was found that the pigment canthaxanthine was the most satisfactory and this together with the milk product Rhodophyll are fed each morning mixed into the normal diet. A visit to Slimbridge will show how effective this method has been.

The various forms are segregated into groups as they would be in the wild. Apart from the Greater and Lesser flamingos which occur together

naturally, and plans are in hand to segregate these for breeding purposes, the races are in separate pens and apart from the James's have comparatively large areas of water and mud over which to wander.

A great deal of trouble has gone into providing suitable nesting-sites for the birds, and each flock has been provided with a carefully constructed 'Atoll'. To visitors these appear to be just a mud flat showing above the water level. First of all the pond has to be drained and the mud removed. Tons of hard core are then tipped onto the site of the island to form a large oval, the edges of which, are brought up to within two ins. of the water level. Concrete is then laid at an angle of 30° over this ridge and as a causeway from the ridge to the feeding places on the banks of the pond. At the narrow ends of the oval the ridge dips to below water level in order to allow water to flow through the middle of the island. Apart from the central channel the whole area inside the ridge is filled up with a mixture of mud and sea-sand to some four ins. above the water. It is essential that the water be kept at such a level as to keep the mud in a consistency that the birds can build their nesting mounds without fear of them disintegrating during the laying or incubating periods. Concrete nests have been built and are quite satisfactory provided they are raised up from the hard core to above the mud surface. Suitability of the building material does seem to be of great importance. At New Grounds, where the soil is heavy clay that bakes hard in the sun, one noted that after a shower of rain during the summer, great building activity would commence with softened mud. Assessing the amount of mud necessary for the flock is difficult as it is not practical to add to it during the nest building activity. The nests are in the shape of flat topped cones some 18 ins. diameter at the base and 12–15 ins. at the top. The height varies from nine to eighteen inches. When there are 20 or 30 nests this amount of mud pulled up into heaps usually results in the nests being surrounded with water and as the building continues for most of the incubation period (28–32 days) in some cases the birds have found difficulty in collecting enough mud with which to carry on.

Although flamingos seem able to survive in quite low temperatures, it has been my experience that they are utterly miserable when left out in the frost and snow of a Severn Valley winter. The fear of the birds getting frozen in and the subsequent breaking of the tarsi when endeavouring to release meant that something had to be done for the birds winter comfort. I therefore built large winter houses over existing water courses. Each house had to be close to a public foot-path and the side of the building adjacent to the path had to be a continuous window (for the benefit of winter visitors). Strip lighting and infra-red heating are provided. The floor is of concrete rendered in cement and sloping at an angle of 30° to the water. Considerable difficulty was experienced in providing a suitable surface, for the soles of the birds feet did not take kindly to the cement. Peat, sand, sawdust and straw were tried, but each of these

became foul so quickly as to be impractical. Rubberised paint seemed at first to be the solution. It was however found that the daily hosing and brushing down destroyed the paint in a relatively short time. Finally the floors have been covered with thin rubber sheeting which can be easily removed or left in situ for washing purposes. In each house there is a door over the water course and a small run adjoining so that the birds can be let out on warm winter days.

After caring for flamingos for ten years, I feel the following observations may be of interest to keepers of these interesting birds.

All species have been found to be easy to herd in and out of their houses, always provided the exercise is carried out tentatively, and that a recalcitrant bird is not chased. Any plan that can be evolved to avoid catching and handling should be pursued. Handling a number of birds usually results in one of them getting a tibio-tarsal joint damaged with, inevitable fatal results. This policy means that the birds should be pinioned on arrival. In our case, the birds have been feather-cut on arrival and pinioned later on; but I think that immediate pinioning would probably be safer. Of course in the Autumn, we have had to catch the juveniles reared in the Summer for this purpose. In the last season experiments have been made in pinioning the day old chicks on the nest, which has been tried with the Greater and the Chilean. In the case of the former it was simplicity itself; one merely lifted the parent's wing, took the chick, performed the necessary operation, and replaced it. Not so with the Chilean. These would all leave the young and one had time to pinion some, but there was a distinct possibility that the downies having been handled would not stay in the nest, but would try to follow the parents and one had the fear that when the parent returned, the baby would not be able to climb back to safety.

It will be seen from the above that it has been found that the six species of flamingos differ considerably in temperament. The Caribbean, which are overlooked by the tea terraces and restaurant are the most apprehensive. When the first member of the staff arrives in the morning, although separated by a considerable stretch of water, the birds, even when nesting, will get up and rush to the farthest point. However as the day progresses they recover and by the afternoon are quite oblivious of the many visitors photographing them.

This initial apprehension does not occur with their cousins the Greater Flamingos, for while they are laying and incubating, it is possible to walk about amongst the nests and to put one's hand under an immovable bird; in fact on being approached a vacant nest will bring the bird back to defend it. Of course the fact that they are so gallant in defence of their nests does not mean that they should be disturbed any more than is necessary for the pinioning of the downies.

The Chilean behave midway between the Greater and the Caribbean. The feeder can approach within a few feet of an incubating bird, but the

nest will not be defended and a further advance results in the adults leaving both eggs and young to the mercy of the intruder.

The Lesser Flamingo would appear to react as the Chilean, though as we have had no young so far, the behaviour has yet to be observed.

The most phlegmatic are the two species from the High Andes, the Andean, have a pen where their nesting atoll is within a yard of the public albeit separated by a fence. Furthermore it is the end of the island nearest to the public where the first nests are built.

The James's are in a pen through which the main pathway passes and the birds like to roost on the tarmac surface. Here, very often, visitors have to walk round them, obviously they get chivvied back on to the water.

Whilst it is believed that the chances of breeding flamingos is increased by having large flocks, it is interesting to note that the Andean at New Grounds number twenty birds and that as many as seven females have laid in one year. A further point of interest is that only one pair have produced fertile eggs. It was wondered whether this was due to the difficulty for a pinioned male to balance himself properly during copulation and it was proposed to feather cut the unpinioned wing to help with this difficulty. Nevertheless as stated before over seventy flamingos have been reared all by pinioned birds.

The normal number of eggs laid is one. On several occasions there have been two eggs in a nest and in one case three eggs. In these cases it has been the fact that two or three birds have laid the eggs.

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THE EATING OF MEAT BY PARROTS

By D. H. S. RISDON (Rode, Somerset, England)

There is a tradition among Aviculturists that parrots are vegetarians and that the eating of meat or any animal food will, among other things, cause them to pluck their feathers. Nevertheless the relish with which they eat meat points to a decided need for animal protein, certainly among the larger parrots.

The first time this came to my notice was at the old Keston Foreign Bird Farm before the war when we bred Blue Fronted Amazons. The breeding pair came from the late Duke of Bedford's collection where they had hatched young on several occasions and, if I remember rightly, the chicks always died at an early age.

The Duke was a stickler for a vegetarian diet for parrots. I think the birds were only given the usual seed, nuts, greenfood and fruit. When they came to Keston, the late Mr. E. J. Boosey decided to supply them with more bulk in their food when they hatched young, so they were given boiled white fish, scrambled egg, boiled potato and rice pudding made with milk. This they consumed eagerly and reared five beautiful young

and I can remember to this day the excitement of looking into a nest box chock full of baby parrots.

Since we came to Rode, we have noted repeated cases of meat eating among our macaws and cockatoos. This first started when our macaws began to breed. Remembering what happened at Keston, as soon as young were hatched the parents were offered extras in the way of bread and butter, and soaked biscuit as well as chop bones and trimmings off the joint which they consumed avidly. Incidentally the meat is always cooked; they do not seem to like it raw, but they will eat raw sprats holding them in one foot and greedily munching them from head to tail as if they were eating a banana.

Our liberty macaws will descend on the bird food trolley as it goes round the grounds in the morning and besides helping themselves to fruit, readily take sprats and meat intended for the aviary birds.

If given a piece of bread liberally spread with butter, they will carefully lick off all the butter before eating the bread. They also prefer shortbread biscuit to other kinds of biscuit presumably because of its higher fat content.

The smaller parrots do not seem so keen on meat. This may be mainly because they do not recognise it as food, but the larger cockatoos like Moluccans and Sulphur Crested are equally keen on meat and fish.

What intrigues me is where would parrots get such food in the wild? It could of course be a substitute for grubs. The beaks of parrots are certainly designed for gouging into rotten wood, possibly in search of these things, but they would have to find a great deal of this food to supply them with what they seem to need. I find it hard to imagine any parrot catching small active prey, although they might conceivably eat the eggs and young of other birds.

Certain it is, however, that they have a distinct liking for food of an animal origin and eat it so greedily that one gets the impression that they are starving for it. The available literature on parrots in the wild only gives a general description of their feeding habits. We all know that they take grain, fruit, nuts, blossoms etc., but little seems to have been studied as to exactly what they do eat. Perhaps some of our overseas members who live in "parrot" country could enlighten us.

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ASPECTS OF A NEW TROPICAL HOUSE FOR BIRDS AT PADSTOW BIRD GARDENS

By RICHARD MARK MARTIN (Curator, Padstow Bird Gardens,
Cornwall, England)

Towards the end of 1971 we began work on the largest and most important single development of these relatively new gardens—which were opened to the public at Whitsun 1970. The, as it transpired to be, accomplished intention was to have our new free-flight Tropical House open by Easter 1972. Our financial circumstances dictated that we did much of the work ourselves, only calling in specialists as and when necessary. This arrangement worked surprisingly well, and I think we all discovered new and unexpected talents.

The main purpose of these notes is twofold: one is briefly to explain certain constructional details which I feel may be of interest and help to others considering similar undertakings, while the other concerns the establishing of plants and birds once the building was completed. That others may benefit from our mistakes and successes is, in my opinion, one of the justifications for our existence.

One conclusion which can be drawn straight away from our tropical house enterprise is that the cost of establishing this kind of near-perfect controlled habitat need not be nearly as prohibitive as one might think. By careful choice of materials, a little basic constructional knowledge and ability, a few extra pairs of hands from time to time and much hard work, a roomy, if not massive, house similar to ours can be constructed for a sum in the region of £2,000 to £3,000. This is inclusive of setting up the boiler and heating system, and I have little doubt that most tropical houses cost very much more than this.

We were fortunate, admittedly, in being able to make use of some existing foundations and walls which to some extent governed the shape and size of the building. The area had been used long ago as a greenhouse and vegetable garden but all that remained were the very thick stone walls which measured about two feet wide. At the rear, the wall was some 12 ft. high but at the front it was only 7 ft. We decided to point and make good these walls, and at the front to add double-glazing—to effectively heighten the wall to 11 ft. This we did and the result was to be a pleasantly high and well-lit enclosure. (The ground dimensions can be seen in the accompanying plan.)

We wanted a light yet strong roof with good heat insulation properties but transparent enough not to hinder too much the passage of solar illumination; on the other hand we did not want a totally transparent material which would doubtless be a source of fright and frustration to the birds housed therein. Eventually we plumped for a double skin of

Natural Translucent Filon supported by angled alum purlins, cross-tied for additional rigidity.

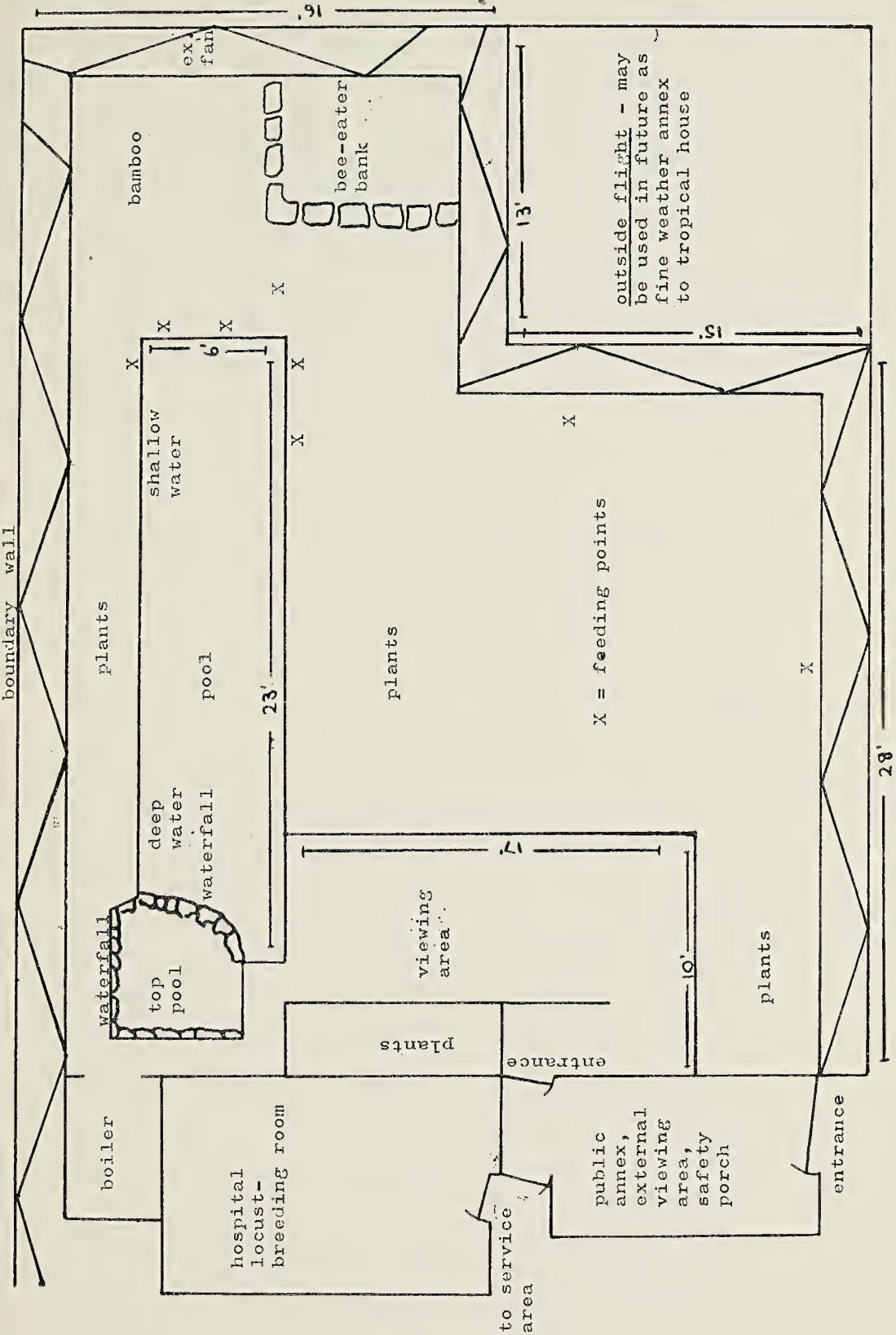
But before we could go ahead with all this, the actual ground which at that time resembled a scrap merchant's back-yard had to be cleared and cleaned up. The pond, which is such an important feature of a tropical house, was to be of a fairly simple shape mainly to facilitate the regular daily cleaning necessary in the temperatures applicable to a simulated sub-tropical habitat. I thought the plants and shrubs when established would help to conceal its rather blatant artificiality. In addition we constructed a shallow second pond at a higher level midway between a recirculating waterfall, operated by a submersible pump in the main water area, to a point some three feet above the higher pond. The idea behind this subsidiary pond, apart from aestheticism, was as a bathing and watering point for the more timid species, and the waterfall itself is appreciated by some, especially sunbirds.

It was decided, without much difficulty, to confine the public to one viewing area near the entrance. This type of arrangement is preferable to a walk-through system in any but the largest of houses as it minimises disturbance to what is the birds' territory, and thus improves breeding prospects and probably cuts losses through egg-stealing, nest-destroying and associated vandalism.

Probably the most intrinsic part of a tropical house situated in a temperate country is the heating and ventilation system. We considered many ideas before choosing an Afos C7 solo air heater which incorporated piped water heating to help spread the output throughout the whole building—a total area of approximately 10,360 cu. ft. This is a highly versatile oil-fired boiler capable of many heating and ventilative tasks. One 12 in. three-speed extractor fan was situated at the opposite end of the building, but considering conditions experienced last summer, I feel we were wrong not to fit a second fan. On hot days, in spite of the fan working at maximum performance, the room temperature shot up alarmingly to in excess of 100°F at times, although I must admit that it affected the public more than the birds! Normally we endeavour to maintain a temperature between 55 and 65°F through a room thermostat.

We took advantage of the heating facilities to locate an observation and locust-breeding room and hospital adjoining the Tropical House, from where we could keep a discreet eye on the birds (and public!). I was also keen to construct some nesting sites within the dividing wall—into which by virtue of glass panes we could observe and photograph any nesting activities. It is still too soon to say if these will be successful.

By the time the actual construction work was finished Easter was rapidly approaching. The next jobs were landscaping, perching and planting. The first thing we did was to build a high long bank of earth retained by large boulders at the far end of the flight, this we hoped would be used for nesting in by kingfishers and bee-eaters. The acquisition of



plants, thanks to certain individuals and the Falmouth Parks Department, did not prove difficult, and we soon had the soil prepared (by mixing in many bales of peat) and the planting accomplished.

The logs and branches brought in for landscaping and perching reasons helped to compensate for the bareness of the obvious new enclosure. Even so, it looked little like the popular opinion of a jungle, and I was afraid that the plants would take years to get established while, in the meantime, the public would begin to mutter darkly. We needn't have worried. I fancy by maintaining a high humidity through regular spraying, and keeping the soil around the plants always moist, we encouraged rapid growth. Indeed, at the time of writing (January 1973), we have just finished a massive pruning and cutting back operation, as one or two of the plants were threatening to take over the entire building.

Especially vigorous and therefore to be recommended "tall plants" were *Cobaea scandens*, the passion flower, angel's trumpet, morning glory, Australian silk oak (*Grevillia robusta*), *Abutilon thompsonii*, jasmine, 'rubber plant' (*Ficus elastica*), *Fatsia japonica*, bougainvillea, monstera, *Clethra alnifolia* and perhaps surprisingly "busy lizzies"—which flourished from the outset and still are. Among the low-growing plants, the familiar nasturtium provided quick and efficient cover, and we have had to be quite ruthless with it; a huge begonia has been in flower constantly since last spring; amongst the others, *Crinum powellii*, a clivia and *Pascicularia pitlalnifolia* have all done well.

The first of the avian inhabitants were to be a pair of Sunbitterns (*Eurypyga helias*)—who quickly made themselves at home and especially liked to skulk in a thick clump of bamboo which we had planted. Following on their heels was a consignment of excellent African birds from Tim and Jane Barnley in Kenya. Included in this consignment were Black-winged Stilts (*Himantopus h. himantopus*), African Jacanas (*Actophilornis africanus*), Woodland Kingfishers (*Halcyon senegalensis*), Tacazze and Malachite Sunbirds (*Nectarinia tacazze* and *N. famosa*) and a Collared Pratincole (*Glareola nuchalis*). Soon after these were established successfully we were able to add Green-backed Tits (*Parus monticolus*) from India, Zebra Doves (*Streptopelia striata*) and some Yellow-rumped Tanagers (*Ramphocelus icteronotus*).

By and large there were few acclimatisation problems. We were forced to remove a male Malachite Sunbird as the "true pair" of Tacazzes were preventing it from feeding, and I think it very likely that we will breed these in 1973 (at least I am hoping so!). We were unfortunate with our Green-backed Tits: one was killed, presumably by a Sunbittern, before it had learnt its way about, and a replacement hanged itself quite recently; this was a great shame as they were obviously content.

The Collared Pratincole, which was acclimatising nicely, was found one day, four months after its arrival, in the pond with severe brain damage. In spite of all our efforts it died the next day. I feel it likely that it flew

into one of the purlins (they definitely form a hazard), although one must not overlook the possibility of vandalism as it occurred in the middle of August. I have my doubts about the suitability of these birds to captive life as they are so obviously as much birds of the air as even the *Hirundines*.

This was the sum of our teething troubles, and, I think, does not reflect too badly. Our aim within the Tropical House is to house only the more compatible species, and for this reason have precluded members of the magpie family *Cracticidae* and other large omnivores. These get along admirably outside where they can have a flight to themselves, and I hope our future breeding results justify this policy.

We are also precluding flamingos, ibis and other relatively large and gregarious water birds for hygienic reasons. Through past experiences I know the difficulties of keeping the soil of indoor aviaries "sweet" in the face of such fierce competition!

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A POSSIBLE METHOD OF SEXING THICK-BILLED PARROTS

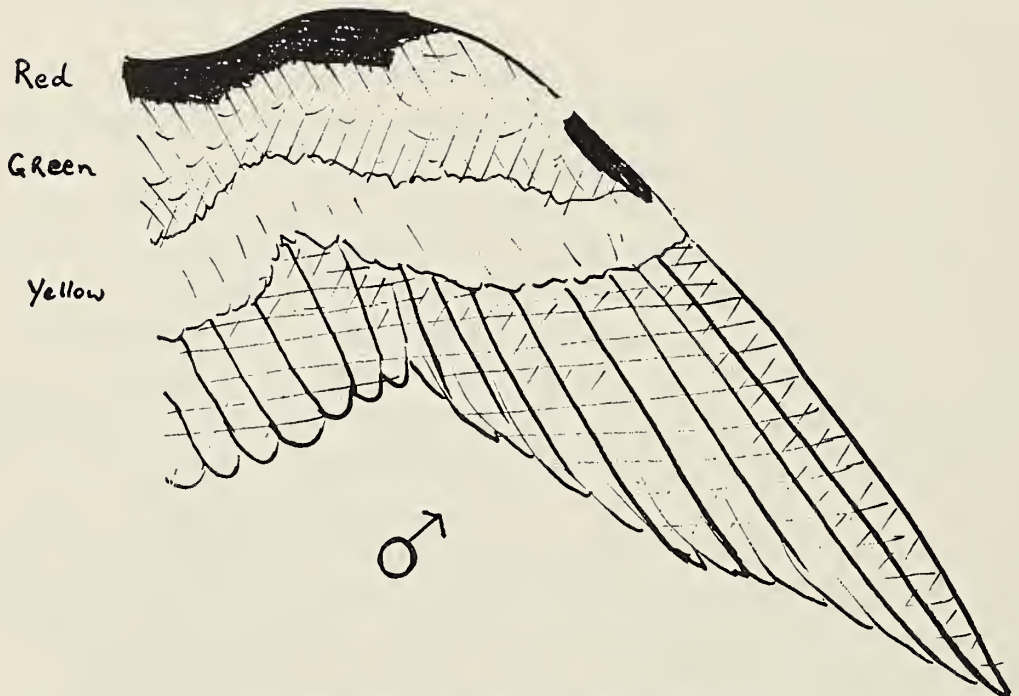
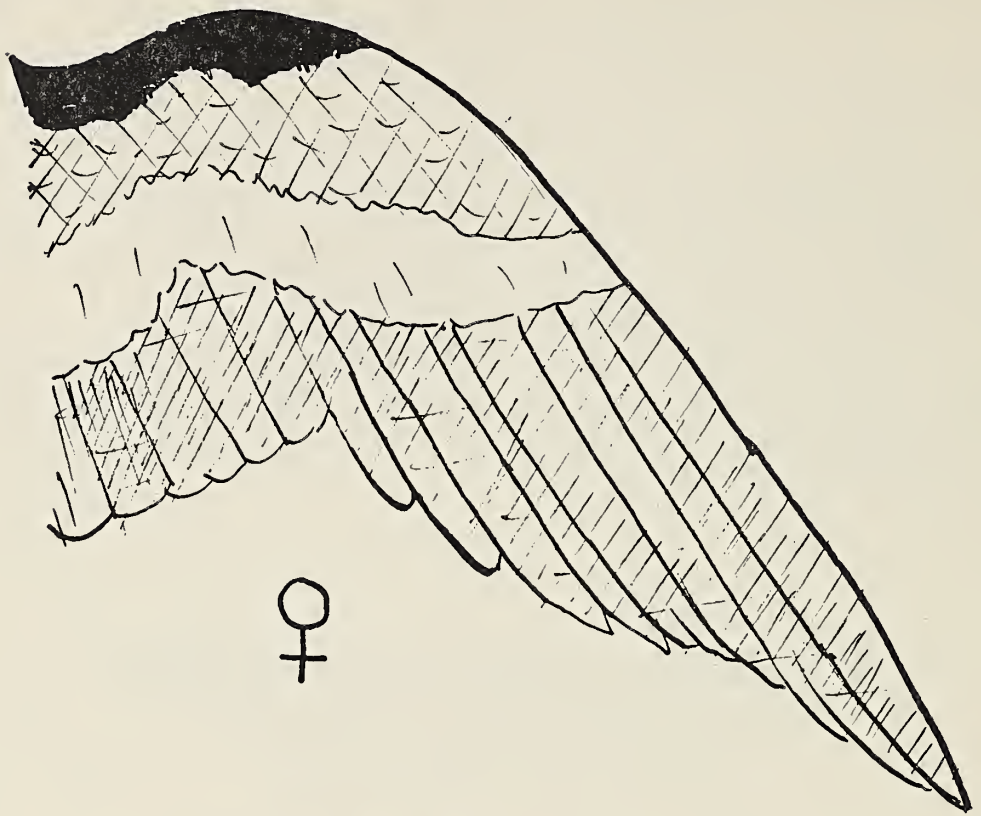
(*Rhynchopsitta pachyrhyncha*)

By GEORGE A. SMITH (Peterborough, Northants, England)

Thick-billed Parrots are very large conures—about 1 ft. 3 ins. (38 cms.) long and with an average weight (15 individuals) of 300 g (over half a pound)—lowest weight 265 g, highest 330 g. A good, indeed the only, illustration of this macaw-like parrot that I know of occurs in the AVICULTURAL MAGAZINE 1927, p. 89. A rough description would be to image a heavy-headed, black-billed parrot of a uniform dulled green with the bend of the wing, face and thighs clearly marked with a deep blood-red. The tail not being quite as elongated as with many conures and macaws.

Although it is not included by Greenway in his *Extinct and Vanishing Birds of the World* (1958), in *Extinct and Vanishing Animals* by V. Ziswiler (1967) nor in *The Red Book* by Fisher, Simon and Vincent (1969) it is, according to the *International Zoo Year Book*, listed as being an endangered species. Several Zoos now provide suitable accommodation for its breeding and it has been illustrated (where the artist has made it resemble a pigeon!) on the 2½ p. Jersey 'Wildlife in danger' series of postage stamps.

It is possible that some confusion as to its rarity might have occurred because of a mix-up with the Maroon-fronted parrot, *R. (pachyrhyncha?) terrisi*, of which Blake, in his *Birds of Mexico* (1953), says 'unlike the Thick-billed Parrot this species is decidedly rare and occupies a very limited range'. The distribution of the Thick-billed Parrot is said to be over a large part of western and central Mexico where they are especially



Under-wing of Thick-billed parrot

characteristic of highland pine forests from Sierra Madre Occidental southwards over the central plateau to Michoacán occasionally being recorded as far east as Veracruz and as far north as Southern Arizona. As Thick-billed Parrots subsist largely on pine seed—a wild crop—even though this seed has commercial value as *piñones* and because water catchment areas have increased value if afforested it might be thought to be reasonably safe from immediate extinction. The authorities in Mexico responsible for supervising exports of native birds seem not to regard it as needing protection for many (100+) have been recently imported into the U.K.. Breeding must continue in the wild for about a third of these imports, I am told, were juveniles with white streaks to the beaks.

Recently I examined fifteen dead Thick-bills. Sexing neotropical parrots is not easy but a friend, on looking at these corpses, correctly sorted out an adult male and female by the difference in boldness about the head and beak, though held his opinion about most of the others. The actual measurements of maximum beak widths, in millimetres was:

<i>Adult males</i>		<i>Immature males</i>	
<i>Upper bill</i>	<i>Lower bill</i>	<i>Upper bill</i>	<i>Lower bill</i>
18.5	23.0	17.9	20.9
18.9	23.0	18.0	23.0
19.0	21.5	18.0	23.5
19.5	23.8	18.8	20.5
20.5	23.8	18.8	22.5
		18.8	23.0
<i>Females</i>			
<i>Upper bill</i>	<i>Lower bill</i>		
17.2	20.0		
17.7	21.5		
17.8	21.8		
18.8	23.0		
19.5	23.5		

Showing that most males have wider, and therefore bigger, bills than females but that this is not an invariable rule.

There was one noticeable difference in the distribution of red feathering on the underside of the wing. In all ten males red feathers were found on BOTH wings at the distal extremity of the 'hand'. Whereas of the five females three had no red in this region on either wing and two hens, one of which was the larger, had an odd red feather in a SINGLE wing only.

RECORDS OF BREEDINGS UNDER CONTROLLED CONDITIONS IN BRITAIN

PART 3

By C. J. O. HARRISON (Berkhamsted, Herts, England)

This is a continuation of the list of which two parts have already appeared—Pt. 1, Crows to Starlings, in vol. 78 (1972) : pp. 169–172; and Pt. 2, Weavers and Waxbills, in vol. 78 (1972) : pp. 205–209.

FINCHES. (*FRINGILLIDAE*).

EVENING GROSBEAK, *Coccothraustes vespertinus*. C. M. Payne. *A.M.* 62 (1956): 167–170.

HAWFINCH, *Coccothraustes coccothraustes*. W. E. Teschemaker. *A.M.* (3) 3 (1911–12): 28–34. *see also* A. A. Prestwich. *A.M.* 52 (1946): 224–225.

BULLFINCH, *Pyrrhula pyrrhula*. J. Sergeant. *A.M.* 1 (1894–5): 124.

RED-HEADED BULLFINCH, *Pyrrhula erythrocephala*. W. H. St. Quintin. *A.M.* (3) 8 (1916–17): 250.

CROSSBILL, *Loxia curvirostra*. A. Silver. (*per.* J. L. Bonhote). *A.M.* (3) 2 (1910–11): 109–117.

PINE GROSBEAK, *Pinicola enucleator*. W. H. St. Quintin. *A.M.* (2) 5 (1906–7): 55–76.

PINK-BROWED ROSE-FINCH, *Carpodacus rhodopeplus*. W. H. St. Quintin. *A.M.* (3) 8 (1916–17): 251.

MEXICAN ROSE-FINCH, *Carpodacus mexicanus*. W. E. Teschemaker. *B.N.* (1) 1 (1910): 363. includes *C. m. frontalis*, House Finch. W. Shore Bailly. *A.M.* (4) 3 (1925): 278–9.

PURPLE FINCH, *Carpodacus purpureus*. G. C. Lynch. *A.M.* 64 (1958): 137–139.

TRUMPETER BULLFINCH, *Rhodopechys githaginea*. E. G. B. Meade-Waldo, *in* A. G. Butler, *Foreign birds for cage and aviary*. (c. 1906) 1: 98.

LINNET, *Acanthis cannabina*. W. T. Page. *B.N.* (2) 7 (1916): 19.

TWITE, *Acanthis flavirostris*. G. C. Swales. *A.M.* 1 (1895): 118.

REDPOLL, *Acanthis flammeus*. B. Carpenter. *A.M.* (2) 6 (1907–8): 160–161.

GOLDFINCH, *Carduelis carduelis*. R. Suggitt. *B.N.* 3 (1904): 70.

BLACK-HEADED SISKIN, *Spinus magellanicus*. W. E. Teschemaker. *B.N.* (2) 3 (1912): 4–9.

HOODED SISKIN, *Spinus cucullatus*. M. Amsler. *B.N.* (2) 3 (1912): 278–281.

SISKIN, *Spinus spinus*. W. T. Page. *B.N.* 8 (1909): 202.

HIMALAYAN GREENFINCH, *Carduelis spinoides*. W. Shore Bailly. (3) 2 (1919): 214. *also note in* (3) 3 (1920): 228.

- CHINESE GREENFINCH, *Carduelis sinica*. W. Shore Baily. *B.N.* (2) 6 (1915): 334-336.
- GREENFINCH, *Carduelis chloris*. J. Sergeant. *A.M.* 1 (1894-5): 124.
- BLACK-HEADED CANARY, *Alario alario*. H. R. Fillmer. *B.N.* 2 (1903-4): 30.
- TIBETAN SISKIN, *Spinus tibetanus*. W. E. Teschemaker. *B.N.* (2) 5 (1914): 278. *See also B.N.* (3) 2 (1919): 214-15.
- CITRIL FINCH, *Serinus citrinellus*. W. E. Teschemaker. *B.N.* (2) 4 (1913): 322.
- SERIN, *Serinus serinus*. G. C. Swales. *A.M.* 4 (1898): 14-15.
- BRIMSTONE CANARY, *Serinus sulphuratus*. W. Shore Baily. *A.M.* (2) 5 (1914): 264-5.
- YELLOW CANARY, *Serinus flaviventris*. W. Shore Baily. *A.M.* (4) 4 (1926): 328-329.
- GREEN SINGING FINCH, *Serinus mozambicus*. "I know it has been bred". E. Hopkinson, 1926.
- YELLOW-RUMPED SEEDEATER, *Serinus atrogularis*. W. E. Teschemaker. *A.M.* (2) 5 (1906-7): 198-200.
- WHITE-RUMPED SEEDEATER, GREY SINGING FINCH, *Serinus leucopygius*. Erskine Allen. *A.M.* 3 (1896-7): 147.
- BRAMBLING, *Fringilla montifringilla*. R. Suggitt. *B.N.* (2) 8 (1917): 234-236.
- BLUE CHAFFINCH, *Fringilla teydea*. E. G. B. Meade-Waldo. *A.M.* 1 (1894-5): 103-104.
- CHAFFINCH, *Fringilla coelebs*. R. James. *A.M.* (5) 3 (1938): 142-143, 161.

TROUPIALS. (*ICTERIDAE*).

- BROWN-HEADED TROUPIAL, *Aegelaius ruficapillus*. W. Shore Baily. *B.N.* (3) 3 (1920): 159-162.
- RED-WINGED BLACKBIRD, *Aegelaius phoeniceus*. London Zoo. 1912, 1913. *L. Z. Repts.*
- YELLOW-HEADED MARSHBIRD, *Agelaius icterocephalus*. Keston Foreign Bird Farm. (E. J. Boosey). *A.M.* 62 (1956): 9-11.

BUNTINGS, GROSBEAKS AND TANAGERS. (*EMBERIZIDAE*).

TANAGERS (*THRAUPINAE*).

- BLUE HONEYCREEPER, YELLOW-WINGED SUGARBIRD, *Cyanerpes cyanea*. Mrs. K. Drake. *A.M.* (4) 12 (1934): 219-220.
- PURPLE HONEYCREEPER, *Cyanerpes caeruleus*. London Zoo. J. Yealland. *A.M.* 74 (1968): 17-18.
- MRS. WILSON'S TANAGER, *Tangara larvata*. J. A. Johnson. *A.M.* 71 (1965): 7.

- FAWN-NAPED TANAGER, *Tangara ruficervix*. H. Murray. *A.M.* 76 (1970): 243.
- CAYENNE TANAGER, *Tangara cayana*. H. Murray. *A.M.* 67 (1961): 181-182.
- FESTIVE TANAGER, *Tangara cyanocephala*. Mrs. S. A. Pearse. *A.M.* (4) 12: 220.
- THICK-BILLED TANAGER, *Euphonia lanirostris*. Jersey Zoo. *A.M.* 77 (1971): 101-102.
- VIOLET TANAGER, *Euphonia violacea*. Mrs. K. Drake. *A.M.* (5) 2 (1937): 231-232.
- BLUE-SHOULDERED MOUNTAIN TANAGER, *Anisognathus flavinuchus*. Keston Foreign Bird Farm (W. D. Cummings). *A.M.* 69 (1963): 30-31.
- WHITE-CAPPED TANAGER, *Stephanophorus diadematus*. Mrs. K. M. Scamell. *A.M.* 71 (1965): 104-106.
- WESTERN PALM TANAGER, *Thraupis palmarum*. Lady Edith Pennant. *B.N.* (2) 3 (1912): 196.
- ORNATE TANAGER, *Thraupis ornata*. Duchess of Wellington. *A.M.* (3) 13 (1922): 123.
- BLUE TANAGER, BISHOP TANAGER, *Thraupis episcopus*. Mrs. A. Speakman. *B.N.* (2) 6 (1915): 168, 260. Includes *T. e. cana* R. B. Abel. *A.M.* (4) 5 (1927): 323-324.
- LEMON-RUMPED TANAGER, *Ramphocelus flammigerus*. Mrs. K. M. Scamell. *A.M.* 76 (1970): 216-219.
- BRAZILIAN TANAGER, *Ramphocelus brasilius*. J. Easton Scott. *B.N.* (2) 3 (1912): 153-155.
- CRIMSON-BACKED TANAGER, *Ramphocelus dimidiatus*. H. Murray. *A.M.* 74 (1968): 202-204.
- BLACK TANAGER, *Tachyphonus rufus*. W. E. Teschemaker. *A.M.* (2) 4 (1905-6): 331-336. *B.N.* 6 (1907-8): 201-203.
- MAGPIE TANAGER, *Cissopis leveriana*. F. E. Thomas. *A.M.* (5) 3 (1938): 355-359.

CARDINALS AND GROSBEAKS. (*CARDINALINAE*).

- NONPAREIL BUNTING, *Passerina ciris*. C. D. Farrar. *A.M.* 5 (1898-9): 165-167.
- INDIGO BUNTING, *Passerina cyanea*. C. D. Farrar. *A.M.* 6 (1899-1900): 270-275.
- BLUE GROSBEAK, *Passerina (Guiraca) caerulea*. London Zoo. *L. Z. Repts.* 1921.
- ULTRAMARINE GROSBEAK, *Passerina brissonii*. W. E. Teschemaker. *A.M.* (3) 1 (1909-1910): 64-65.
- GOLDEN-BILLED SALTATOR, *Saltator aurantirostris*. H. Bright. *B.N.* (3) 4 (1921): 203-205.

- RED CARDINAL, *Cardinalis cardinalis*. C. D. Farrar. *A.M.* 5 (1898-9): 2-5, and H. D. Astley. *A.M.* 5 (1898-9): 5-7.
- BLACK-HEADED GROSBEAK, *Pheucticus melanocephalus*. W. E. Teschemaker *B.N.* (2) 4 (1913): 7-9.
- ROSE-BREASTED GROSBEAK, *Pheucticus ludovicianus*. H. D. Astley. *A.M.* (3) 2 (1910-11): 333-337.
- YELLOW GROSBEAK, *Pheucticus chrysopheplus*. E. J. Brook. *A.M.* (3) 8 (1916-17): 28-29.
- DICKCISSEL, *Spiza americana*. W. E. Teschemaker. *B.N.* (2) 2 (1911): 268.

BUNTINGS (*EMBERIZINAE*).

- YELLOW-BILLED CARDINAL, *Paroaria capitata*. M. Amsler. *A.M.* (3) 12 (1921): 160, and G. Rattigan. *A.M.* (3) 12 (1921): 133-135.
- BLACK-THROATED CARDINAL, *Paroaria gularis*. A. Ezra. *A.M.* (5) 2 (1937): 251.
- RED-CRESTED CARDINAL, *Paroaria coronata*. B. Hamilton-Scott, *per* W. T. Page. *B.N.* (2) 4 (1913): 285.
- RED-COWLED CARDINAL, *Paroaria dominicana*. Lady E. D. Pennant. *B.N.* (2) 3 (1912): 156-157.
- PILEATED FINCH, *Coryphospingus pileatus*. Mrs. H. Williams. *A.M.* (2) 4 (1905-6): 30-34.
- GREEN CARDINAL, *Gubernatrix cristata*. C. D. Farrar. *A.M.* 3 (1896-7): 192.
- SPOTTED TOWHEE, *Pipilo maculatus*. C. M. Payne. *A.M.* 61 (1955): 224-226. (*P. m. oregonus* bred).
- BLACK-FACED GRASSQUIT, *Tiaris bicolor*. H. Wilford. *B.N.* (2) 1 (1910): 231.
- OLIVE FINCH, *Tiaris olivacea*. D. Seth-Smith, in A. G. Butler, *Foreign birds for cage and aviary* (c. 1906) pt. 1: 150.
- CUBAN FINCH, *Tiaris canora*. L. W. Hawkins. *A.M.* 7 (1900-1): 29.
- BLACK SEED-FINCH, *Melopyrrha nigra*. W. Shore Baily. *B.N.* (2) 6 (1915): 219-222.
- WHITE-THROATED SEEDEATER, *Sporophila albigularis*. C. D. Farrar. *A.M.* (2) 3 (1904-5): 358-362.
- GUTTERAL FINCH, *Sporophila nigricollis*. W. T. Page. *B.N.* (2) 3 (1912): 338.
- GREY SEEDEATER, *Sporophila intermedia*. W. T. Page. *B.N.* (2) 3 (1912): 338.
- CAYENNE SEEDEATER, *Sporophila frontalis*. W. R. Partridge. *A.M.* 70 (1964): 111-113.
- BLUE-BLACK GRASSQUIT, *Volatinia jacarini*. R. Suggitt. *B.N.* (2) 1 (1910): 363.
- GRASSLAND YELLOW FINCH, *Sicalis luteola*.:— includes, Yellowish Finch, *S. l. arvensis*. D. Seth-Smith. *A.M.* (2) 4 (1905-6): 340-341.

- Yellow-bellied Finch, *S.l. luteiventris*. W. Shore Baily. *B.N.* (3) 5 (1922): 179-181. Least Saffron Finch, *S. l. minor*. M. Amsler. *A.M.* (3) 7 (1915-16): 25-28.
- SAFFRON FINCH, *Sicalis flaveola*. Bred several times including, *B.N.* (1904): 247, *vide* E. Hopkinson, *Records of birds bred in captivity*. (1926). Includes Pelzeln's Finch, *S. l. pezelni*. W. E. Teschemaker. *A.M.* (3) 1 (1909-10): 226.
- CHESTNUT-AND-BLACK WARBLING FINCH, *Poospiza nigrorufa*. A. Silver. *A.M.* (5) 3 (1938): 98-101.
- CINNAMON WARBLING FINCH, *Poospiza ornata*. Keston Foreign Bird Farm (W. D. Cummings). *A.M.* 66 (1960): 171-172.
- COMMON DUICA FINCH, *Duica duica*. London Zoo. *L. Z. Repts.* 1887.
- BLACK-CRESTED FINCH, *Lophospingus pusillus*. Mrs. P. R. Cholmeley. *A.M.* (5) 3 (1938): 274-275.
- MOURNING SIERRA-FINCH, *Phrygilus fructiceti*. M. Amsler. *B.N.* (2) 6 (1915): 173-175.
- SLATE-COLOURED JUNCO, *Junco hyemalis*. London Zoo. *L. Z. Repts.* 1913.
- WHITE-CROWNED SPARROW, *Zonotrichia leucophrys*. London Zoo. *L. Z. Repts.* 1921. (*Z. l. gambeli* bred).
- HARRIS'S SPARROW, *Zonotrichia querula*. W. Shore Baily. *A.M.* (4) 9 (1931): 252-254.
- RUFIOUS-COLLARED SPARROW, *Zonotrichia capensis*. W. E. Teschemaker. *A.M.* (2) 6 (1907-8): 26-30.
- SNOW BUNTING, *Plectrophenax nivalis*. G. T. Kay. *A.M.* (5) 9 (1944): 106-107.
- LAPLAND BUNTING, *Calcarius lapponicus*. W. E. Teschemaker. *vide* E. Hopkinson. *A.M.* (4) 12 (1934): 512. (bred 1916, details said to be sent to Cage Birds at time).
- REED BUNTING, *Emberiza schoeniclus*. W. E. Teschemaker. *B.N.* (2) 1 (1910): 308-309.
- GOLDEN-BREASTED BUNTING, *Emberiza flaviventris*. N. G. Allison. *A.M.* (5) 4 (1939): 314-317.
- YELLOW-BREASTED BUNTING, *Emberiza aureola*. Chester Zoo (W. H. Timmis). *A.M.* 78 (1972): 9-11.
- RED-HEADED BUNTING, *Emberiza bruniceps*. Chester Zoo (W. H. Timmis). *A.M.* 79 (1973): 3-7.
- CINNAMON-BREASTED ROCK BUNTING, *Emberiza tahapisi*. M. S. Aldham. *A.M.* (5) 2 (1937): 311-313.
- CIRL BUNTING, *Emberiza cirlus*. W. E. Teschemaker. *B.N.* 7 (1908-9): 145-148.
- YELLOWHAMMER, *Emberiza citrinella*. H. Willford. *B.N.* (2) 2 (1911): 238.

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NEWS FROM THE BERLIN ZOO

By PROFESSOR DR. HEINZ-GEORG KLÖS

Again our breeding pair of European Eagle-Owls (*Bubo bubo*) hatched three fine chicks on 12th, 14th, and 16th March. The mother is well accustomed to people watching her closely and never feels disturbed during nesting time. So we are lucky in not having to provide her with a straw-screen, and the Eagle-Owls are one of the very first spring attractions for the public every year.

The Black Swans (*Cygnus atratus*) fortunately got their young in a fairly fine time in March. Usually these Australians hatch their young during their "natural" springtime, which means winter in Europe.

New arrivals:

3 Little Stints (*Calidris minuta*), 1 Common Thickknee (*Burhinus oedicephalus*), 2 Hammerkops (*Scopus umbretta*), 2 Bar-tailed Cuckoo Doves (*Macropygia unchall*), 1 Kestrel (*Falco t. tinnunculus*), 1 Red-crested Cockatoo (*Cacatua moluccensis*), 2 Fischer's Lovebirds (*Agapornis fischeri*), 2 Quaker Parakeets (*Myopsittacus monachus*), 1 Black-headed Conure (*Nandayus nenday*), 1 Red-billed Hornbill (*Tockus erythrorhynchus*), 2 Yellow-bellied Leiophris (*Leiophris lutea*), 1,1 Orange-breasted Flower Peckers (*Dicaeum trigonostigma*), 1 Masked Flower Piercer (*Diglossa personata*), 0,1 Brasilia Hangnest (*Icterus jamaicii*), 5 Serins (*Serinus serinus*), 6 Siskins (*Carduelis spinus*), 5 Goldfinches (*Carduelis carduelis*), 3 Common Linnets (*Carduelis cannabina*), 1,1 Red-headed Finch (*Amadina erythrocephala*), 1 Javan Hill Mynah (*Gracula r. religiosa*), 2 Rosy Pastors (*Pastor roseus*), 3 Indigo Buntings (*Passerina cyanea*), 4 Cedar Waxwings (*Bombycilla cedrorum*), 2 Bluish Seed eaters (*Sorophila albogularis*), 2 Pileated Finches (*Coryphospingus pileatus*), 0,1 Eastern Cardinal (*Cardinalis cardinalis*), 1 White-throated Jay-Thrush (*Garrulax albogularis*), 2 Hunting Crows (*Cissa chinensis*), 2,2 Purple Finches (*Carpodacus p. purpureus*), 2 Blue-winged Fruitsuckers (*Chloropsis hardwicki*), 2 Migratory Thrushes (*Turdus migratorius*), 2 Violet Tanagers (*Euphonia violacea*).

* * *

NEWS AND VIEWS

Two Takahes were hatched at the Mount Bruce Native Bird Reserve in New Zealand on Christmas Day 1972. This blue and green flightless species was believed to be extinct until 1948 when it was rediscovered in the mountainous, inhospitable country west of Lake Te Anau in the South Island. Fewer than 500 exist and every effort is being made at Mount Bruce to help conserve the species. Part of the conservation programme includes a determined attempt to breed the bird in captivity. Although wild caught chicks have been reared, and adults have nested before at Mount Bruce, this is the first occasion on which fertile eggs have been produced. I visited the Reserve in February of this year and was dismayed to learn that both the chicks had died because they had congenital abnormalities of the alimentary tract. However, the parent birds were making very good foster parents for a young Pukeko. As a parrot enthusiast I was very impressed by the success which the Reserve is having with parrakeets of the genus *Cyanoramphus*. Considerable numbers of the Yellow-fronted and Red-fronted species have been bred and, since my previous visit in 1969, several of the All Green Antipodes Island and the large Antipodes Island Red-crowned species. I believe that neither of these two members of the genus has been bred in captivity before.

* * *

It has been estimated that more than a hundred Amboina King Parrots of at least two different sub-species were imported in 1972. It is gratifying that most appear to have survived and several parrakeet breeders are now the proud possessors of potential breeding pairs. In this context it is interesting that although one of the sub-species has already been bred in this country the event was not well documented and appears to have escaped the notice of most people interested in parrakeet breeding. The successful rearing of a male and a female Salawati King took place in the late Duke of Bedford's Collection at Hayward's Heath when it was in the care of F. Gorman. The event is described very briefly in the Magazine of the Foreign Bird League (1940).

* * *

Since 1964, 25 Kea Parrots have been reared at the Zurich Zoo.

* * *

Breeding results 1972.

Mats Tell, Ljungbyhed:

" This season my parrakeets have been fairly successful and the following young were reared: five Stanleys, five Redrumps, one Manycoloured (which was reared by a pair of Stanleys), one Turquoise and eleven Bourke's. My Red Cardinals have four young which have now moulted into adult plumage; they proved to be two cocks and two hens and they are really magnificent birds. My softbills have failed. My old cock Silver-eared Mesia died after one day's illness and the hen of my second pair came into a heavy, and too early, moult. The hen Pekin Robin, which has been in my possession for nine years, would not lay although the pair had a complete nest. The Blue-winged Sivas had their first three eggs infertile and the newly-hatched chicks of their second clutch were immediately eaten by the female.

W. Langberg, Copenhagen: " I had young Pileated, Rock Peplar, Crimson-winged, Pennant's (the lesser red from North Australia), Princess of Wales, Blue Ring-necked and Blue-winged Parrakeets, Lutino and Pied Cockatiels, Spectacled Parrotlets and Cherry, Diggle's, Bicheno and Peale's Parrot-finches. The King Parrots had infertile eggs and the Leadbeater's Cockatoos laid but would not sit. "

E. Norgaard-Olesen, Janderup: " I bred one *Loriculus vernalis* and one *L. galgulus*. Several of my Tanagers had eggs but none succeeded. "

Dr. L. F. Baptista: " Dr. Hans Löhrl, the director of the *Max Planck Institut für Verhaltenphysiologie Vogelwarte Radolfzell*, has twice bred the Parrotbill (*Paradoxornis webbiana*). The first egg of the first clutch of six was laid on 12th May 1971. Three eggs were removed for protein studies and substituted with three flycatcher eggs so that the parrotbills could incubate a normal clutch size. Two Parrotbills hatched and were removed when seven days old and hand-reared in connection with Dr. Löhrl's behavioural studies. A second clutch of five was started on 28th June 1971. Three young hatched, two of which were raised to maturity by their parents. The eggs of a third clutch were removed. This is very likely a first breeding for the genus in captivity. Jean Delacour's breeding of *Paradoxornis fulvifrons* (AVICULTURAL MAGAZINE, 1973, 79, 18) is probably a second record for the genus. In 1971 Dr. Löhrl also bred the Wallcreeper (*Tichodroma muraria*). Two young were raised to maturity by their parents. The Wallcreepers are now on display at the Innsbruck Zoo. Some of the Parrotbills were sent to the Basel and Frankfurt Zoos.

E. Williams, Hambledon: " nine Splendid Parrakeets from four pairs, eight Turquoisines from three pairs, six Elegants from two pairs, five Bourke's from three pairs, one Golden-Mantled Rosella from two pairs and two Pennant's from two pairs. No Many-coloured were reared from three pairs and Blue-wings did not go to nest "

R. T. Kyme, Kirton: "four Weber's and one Edward's Lorrikeets, three Mealy Rosella, four Stanley, five Turquoise, five Yellow Red-rump, three Quaker and three Lutino Ring-necked Parrakeets. My Yellow-fronted New Zealand Parrakeets had five chicks which they let die—last year they reared some lovely birds. My Cape Parrots arrived too late in the season to breed. My latest arrivals are two pairs Iris Lorrikeets, one pair Dusky Lories, one pair Yellow-streaked Lories, one pair Everett's Blue-backed Parrots and one pair of Blue-naped Mousebirds".

* * *

At Birdland, Bourton-on-the-Water a new Tropical House was officially opened on 26th September 1972. It provides another example of Len Hill's remarkable flair for designing enclosures which are both highly practical and very attractive. It accommodates in several different compartments Toucan Barbets, Narina Trogons, Renauld's Ground Cuckoos etc. as well as a superb collection of Bee-eaters most of which are the exquisite Carmine species.

J. R. H.

* * *

COUNCIL MEETING

A Council Meeting was held on 11th April, 1973, at the Linnean Society, London, W.1.

The following members were present:

Miss Phyllis Barclay-Smith (Vice-President), in the chair.

Mr. P. B. Brown, Mr. J. O. D'Eath, Mr. M. D. England, Dr. C. J. O. Harrison, Professor J. R. Hodges, Mr. F. Meaden, Mr. H. Murray, Mr. N. R. Steele, Mr. K. A. Norris, Mr. P. J. S. Olney.

Mr. H. J. Horswell (Hon. Secretary and Treasurer), Mrs. M. H. Haynes (Assistant Hon. Secretary).

CHANGE IN RULES

It was agreed that the procedure for electing new Members should be amended so that a Proposer was no longer needed. Rule 3(b) now reads as follows:—

"... that every applicant for admission as a Member of the Society must himself duly complete and sign the application for admission form. The name and address of every applicant shall be published in the next issue of the Magazine. Unless the applicant shall within four weeks after the publication of his name in the Magazine be objected to by at least two Members, he shall be deemed to be duly elected. If two or more Members shall object to any applicant the name of such an

applicant shall be brought before the Council at their next Meeting, and the Council shall have power to elect or disqualify him from election."

ELECTIONS

Mr. A. A. Prestwich was elected an Honorary Vice President in recognition of his long service to the Society as Hon. Secretary and Treasurer, and founder of the British Aviculturists' Club.

Mr. J. Alastair Anderson, Captain W. Mountain and Captain H. S. Stokes were elected Honorary Life Members having belonged to the Society for fifty years. Council passed a vote of thanks for their long interest and support.

H. J. HORSWELL,
Hon. Secretary and Treasurer.

* * *

BRITISH AVICULTURISTS' CLUB

The one hundred and ninth Meeting of the Club was held on Wednesday, 11th April, 1973, at the Linnean Society, Burlington House, London, W.1.

The following Members attended: Mrs. D. E. Balcon, W. Brain, J. O. D'Eath, E. H. Down, Miss W. Duggan, M. D. England, R. Grantham, C. J. O. Harrison, Mrs. M. Haynes, L. W. Hill, J. R. Hodges, H. J. Horswell, F. Jones, H. G. Kenyon, H. Murray, K. A. Norris (Chairman), N. O. O'Connor, B. Sayers, N. R. Steele.

Total attendance: 17 Members, 32 guests.

The Meeting started at 6.30 p.m. with a Wine and Cheese Party, followed by a film "The Baobab Tree" presented by Mr. Mike Kendall, Librarian of the BBC Natural History Unit, who gave a most interesting talk describing how the film was made. Our thanks are due to Mr. Kendall for giving the Members such an enjoyable evening.

* * *

Avicultural Society Members are reminded that they are entitled to attend one Meeting of the British Aviculturists' Club before deciding whether they would like to join. The subscription for membership is 50p a year.

We are always delighted to welcome overseas Members as guests at our functions—please let us know if you are coming to England in case your visit coincides with a Meeting.

MARY HAYNES,
Hon. Secretary.

* * *

REVIEW

THE PARROTS OF SOUTH AMERICA. By ROSEMARY LOW.
London: John Gifford, 1972. Price £3.25p.

Although Central and South America contain the greater part of the world's parrot species, very little information has been available in the past, in spite of the amount written about the relatively smaller number of Australian species. With the shift of sources of bird imports over the years an increasing variety of American parrots have become available to the aviculturist, who at times has found it difficult to discover which species he had. Rosemary Low's book is therefore an important addition to parrot literature, as the only work specifically covering this region.

The book is written for the aviculturist and the text constantly reflects the author's considerable experience in the keeping of these birds. The opening chapters on purchase, accommodation, feeding, general care, and breeding contain a lot of good practical advice.

The parrots themselves are grouped in five chapters—headed Macaws, Conures, Parrakeets and Parrotlets, Small Parrots, and Amazons. This section brings out one shortcoming of the book. Some 144 species and their subspecies are involved, but there is no general key to the identification of the different types of South American parrots and their species groups. Those familiar with some of the birds may find this satisfactory, but the beginner with an unknown bird might need to work through most of the text to identify it. There is an identification key for the Amazon species, and something of this kind would have been a help elsewhere—with the *Pyrrhura* species for instance.

Each genus or natural group of smaller genera is introduced with a general text, differing considerably in length, seemingly related to the extent to which the birds are kept, but usually containing information on the suitability of the species as pets or aviary birds, and sometimes on their general keeping and breeding. Following this birds are dealt with as species and subspecies. The text for each, where sufficient information is available, includes alternative popular names, and a brief description of adult and immature birds. Distribution is given, varying from precise habitat data where available, to a brief statement of geographical region. This is followed by a section headed "remarks" which usually gives information on the extent to which the species has been imported and kept by aviculturists, together with various pieces of information, and quotations from published sources, of the general demeanour and needs of the birds; as well as any facts which are not covered by more specific headings. Finally there are sections on breeding results, with data on captive breedings.

The arrangement is a little difficult to follow at times owing to the treatment of subspecies. In recent revisions of parrot classification birds

which were earlier thought to be separate species have been grouped together under one name. In the present work species and subspecies are often listed with similar headings. Separate English names may be used in each case without a clear indication, other than in the abbreviated Latin name, as to which is involved. Some subspecies are, however, listed with only subsidiary headings, and a few with no indication of how they differ from the described forms. This may reflect the degree of avicultural interest in the birds concerned, and from that viewpoint the arrangement may be satisfactory, but otherwise it does not commend itself. I feel that the species unit should have been more clearly indicated, and that the popular names for subspecies should have been less prominent.

In the plates 42 species are illustrated by colour photographs. There is an appendix note on the taking of, such photographs; and one on known abnormal plumage variations in these species. In spite of criticism the book is a useful and timely addition to avicultural literature.

C. J. O. H.

* * *

CORRESPONDENCE

HANGING PARROTS

My first recollection of Hanging Parrots was at a National Cage Bird show. The second time was in Singapore, on my first visit to three of the bird shops, where they each had a small number of Blue Crowned.

The next time I saw this group was during this voyage at Goa, where we were loading Iron Ore. It was on the second day there; a young man came on board with four Vernal's. At the time, I had no intention of acquiring any as my hopes were for Sunbirds or any insectivorous birds. One of the assistant stewards, who takes home small parrot-like birds for his father, acquired them for a shirt. Later, through an Anglo-Indian boy, I found out they were to be had in town for as low as 10p. I have since found out at home they cost between £5 and £7 a pair, which is certainly a great contrast. Two more boys bought two each in the following days and the same Indian boy had six more the day we sailed for Japan.

In Japan, I acquired five of them as their previous owners did not wish the birds to mess up their newly acquired electrical equipment. At the time of writing, I have had them for a month. In this time I have noticed that each has its own character.

They sit for most of the day on top of the bell-like cage moving down to the table, on which it stands, for food and water. Each morning when I uncover them, as I always put them in at night, the most nervous one is always the first out. It makes straight for the water which I have just put down. It proceeds to dip only its head and breast, then climb up the cage to preen itself. Another makes for the food dish, looks in and then up to the top of the cage. The other three remain inside. Nothing more happens until I have left the cabin. On my return, about an hour later, they are all on the carpet with the exception of one which is always on my bunk, as it can fly quite well.

I feed them on sponge cake, which one can easily get on a ship, which has gone a little stale then soaked in diluted honey and a little fruit. This diet appears to be quite adequate as their droppings are soft, semi-solid and normal in appearance.

They do not seem to mind noise at all, even sudden ones, as I play my tape-recorder when ever I get the opportunity at a reasonably good volume. They appear to like certain pieces more than others as they come to life even joining in with chirps and squeaks. Their voices are heard, at other times, only occasionally so they are the least offensive of parrots.

I would have liked to have kept these five, but being away at sea this is impossible. I have asked Mr. B. Reed, another of our members, if he can find a home for them. One of their habits, of which they have just reminded me, is the rubbing or scraping of the tongue on their bills giving quite a loud rasping sound. Why they do this I can only guess: to clean the tongue or the beak.

In his book Whistler says that, "iris yellowish white; bill coral red, tip yellow; cere darker red", but in my five the bill is orange with a hint of red in two and the eye is completely dark. In the book the iris colour is clearly indicated in the monochrome illustration. Are my birds young ones and do these features change with age? Can any member more experienced with this group comment on this matter?

M.V. TREBARTHA
P & O GENERAL CARGO DIVISION.

ALAN BOOTH.

The Editor does not accept responsibility for opinions expressed in articles,
notes, or correspondence.

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NEW MEMBERS

The 18 candidates for Membership in the March-April 1973 number of the AVICULTURAL MAGAZINE were duly elected members of the Society.

CANDIDATES FOR MEMBERSHIP

R. F. CLARK, 124 Main Street, Yaxley, Peterborough.
R. R. DAVIES, Adolfo Prieto 1017, Colonia del Valle, Mexico 12, D. F. Mexico.
J. A. FORMAN, Route 2, Box 41, Enumclaw, Washington 98022, U.S.A.
G. JOHNSON, 62 Carlisle Road, Westbourne Park, South Australia 5041, Australia.
JEAN-CLAUDE RIGNAULT, 35 rue léon Gambetta, 76210 Bolbec, France.
MR. & MRS. J. C. SMITH, East Gore RR 1, Elmsdale, Hants County, Nova Scotia, Canada.
L. R. SMITH, 6 Scotswood Place, Rangiora, South Island, New Zealand.
MRS. M. A. STRONG, 4 Bayview Terrace, Porthleven, Helston, Cornwall.
MISS O. L. WELCH, 21 Gun Lane, Knebworth, Herts. Proposed by Mrs. S. Belford.
MR. R. HOWARD, Chastleton Aviaries, Codsall Wood, Nr. Wolverhampton Staffs.

DONATIONS

(Colour Plate Fund)

Mr. P. Kinchington	Capt. H. Stokes
Mr. E. P. McCabe, Jnr. M.D.	Danai Snid-Vongs, M.D.

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L. L. MUNGER, to 1409 Westwind, Manhattan, Kansas 66502, U.S.A.
D. BOURNE, to RR1 Kirkhams Road, West Hill, Ontario, Canada.
MRS. C. EVERITT, to 10 Stacy Avenue, Trenton, N.J. 08619, U.S.A.
MR. W. L. DEIERLING, to Fleet Component, Naval Section, Jusmag-K-FPO Seattle, Washington 98769, U.S.A.
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BRIAN M. WILLIAMS, to Doondy Estate, P.O. Box 52, Kenya, E. Africa.

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THE AVICULTURAL SOCIETY

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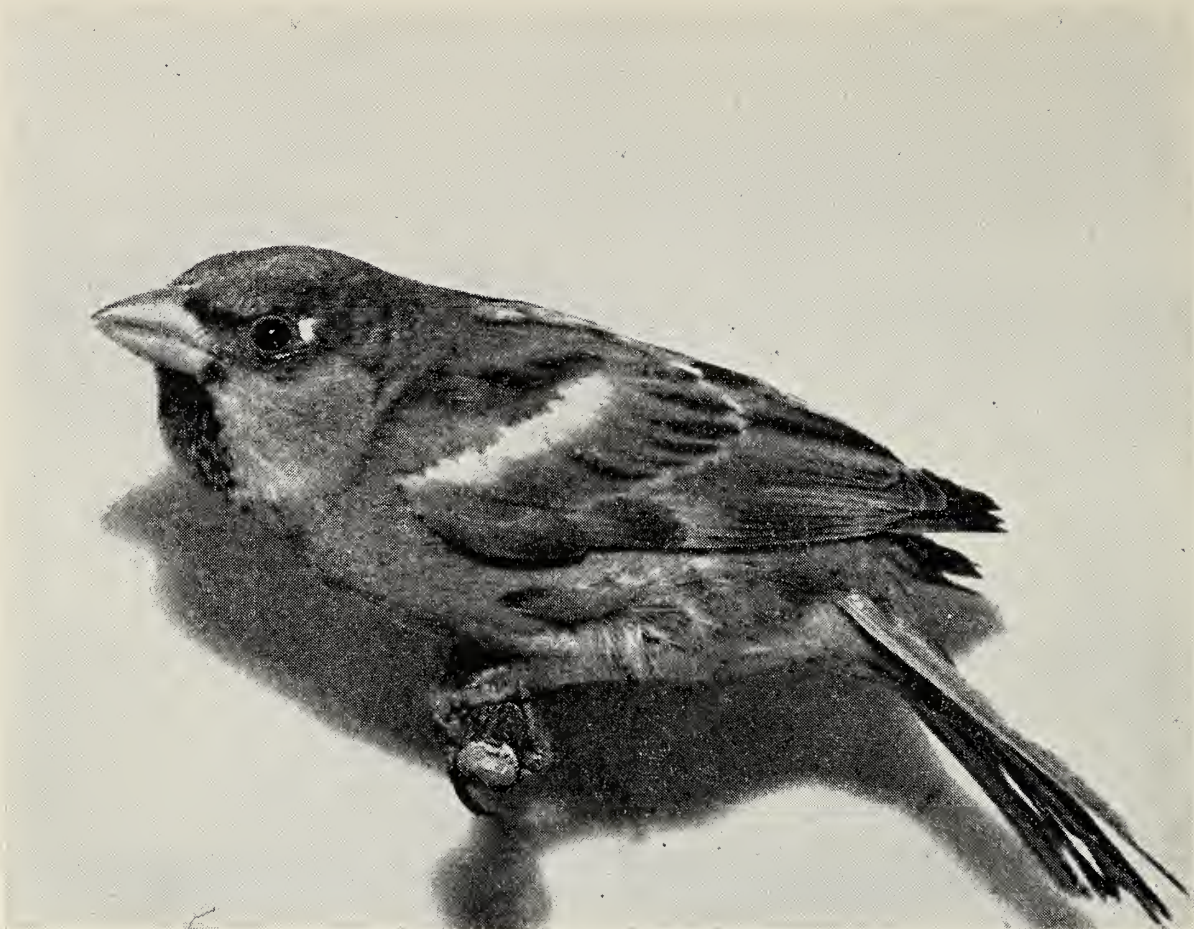
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 Dr. Colin Harrison, 22 St. Margaret's Close, Berkhamsted, Herts.



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[Derek Washington

The abnormally coloured male House Sparrow showing the pale bill
and lighter brown regions of the head



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[Derek Washington

A normal male House Sparrow for comparison

AVICULTURAL MAGAZINE

THE JOURNAL OF THE AVICULTURAL SOCIETY

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JULY-AUGUST 1973

BREEDING THE HOUSE SPARROW

By DEREK WASHINGTON (East Grinstead, Sussex, England)

It would seem that no one has yet published an account of breeding House Sparrows *Passer domesticus* in captivity in Britain. This lack of information was brought to light by C. J. O. Harrison (AVICULTURAL MAGAZINE 77 (1971) 131-135 and 78 (1972) 205-209) and the second of his lists finally pricked my conscience and stimulated me to prepare these notes. The following account describes breeding attempts, some successful and some not, between the years 1967 and 1971. Further interest is added by the fact that the male parent was abnormally coloured, and that this abnormality was not inherited by any of the offspring, even when the male was paired back to his daughter.

Towards the end of 1966 I was given an unrelated pair of House Sparrows. The female was normal in colour, but the male was paler than normal. He showed all the markings of a male, but the colours were reduced in intensity giving an overall fawn appearance. The normally black bib, for example, was dark grey and the chestnut regions on the neck were light brown. The bill was a yellowish horn colour, even in summer when it should be black, and the eyes appeared red when viewed with a bright light directly behind the observer.

For convenience, I shall refer to this bird as dilute, though this may not be scientifically accurate. I am not certain of the origin of these birds but believe they were taken from the wild.

In 1967 they were kept in a large double breeder cage in my garden shed at Redhill in Surrey. They were given a Budgerigar nestbox, but made no attempts to use it. Food at this time (April) consisted of a soaked seed mixture up as follows:—2 parts British Finch mixture, 2 parts wild seeds, 1 part niger. Each bird consumed about 1½ teaspoons of this mixture daily. A good supply of maggots was always available, also sweet apple and coltsfoot.

On 30th April I transferred the birds to an aviary measuring 12 ft. × 7 ft. × 7 ft. high. The rear wall was timber, covered on the inside with bunches of heather. The rear 2½ ft. of roof was also timber to provide shelter. The aviary already contained one pair each of the following species:—Canary, Bullfinch, Greenfinch, Goldfinch, Siskin and Redpoll. Within minutes of their release in the aviary the male House Sparrow started chasing his female all over the place in a most excited manner.

Fresh wild seeding plants were given daily as they became available; for example in June I saw the House Sparrows eating chickweed, sow thistle and plantain. In spite of frequent chasing by the male no nesting activity was noticed until 6th June, when an attempt was made to build a nest high among the heather under the covered roof. There was very little material to act as foundation, so I fixed a Budgerigar nestbox at this spot. This suited the birds fine, though not in the way I expected. They built on top of the box, sandwiching their nest between it and the roof—a height of two to three inches. One result of this was that the nesting chamber had a hard wooden floor with no lining over it. The nest was rapidly constructed from dry grasses and some of the various plants which were offered to the birds as food, such as long stems of great plantain. A sparse lining of feathers was subsequently added.

The first egg appeared on 13th June, followed by three others at daily intervals. Incubation appeared to be by the female alone. On 25th June I noticed a sudden increase in the rate of maggot consumption, and assumed the eggs were hatching. On the following day I gingerly felt in the nest and found three chicks and an egg. This egg did not hatch and disappeared within the next two days. The Handbook gives an incubation period of 12 to 14 days, starting from the completion of the clutch. In the present case there were certainly young in the nest 10 days after the last egg was laid, and probably as soon as nine days after.

On 1st July I examined the nestlings. One had a deformed leg with the knee joint apparently working the wrong way round, so that the leg was pointed forwards towards the wing. At the time I wondered whether this might be a consequence of the very shallow nest with its hard wooden floor. The other two young were ringed with the recommended B.B.B.A. rings, size B3. These would barely go on, although the young were probably only five or six days old. Later on the legs became much thicker and the soft fleshy surface bulged out over the rings. This worried me, and I managed to cut the rings off without harm to the birds. A bigger ring would not solve this problem as I had been able without difficulty to fit B3 rings on to the legs of both parents when they were adults. The House Sparrow is one of those species which exhibits "puppy fat", that is the legs of nestlings are thicker than those of adults. Some measurements of a subsequent brood showing this phenomenon are given later in the article. It seems likely that close rings are unsuitable for this species.

All three young appeared to have normally coloured skin with no trace of any pale features. They differed from the young of other species I was breeding, Greenfinches for example, in showing no traces of fluffy down. They were simply bald and ugly, with a few quills beginning to push through.

By 7th July I was able to offer daily supplies of blackfly on stems of dock and thistle, but I did not notice the Sparrows eating these. They



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The nest in 1967

[Derek Washington



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Pale and normal eggs from the same clutch (1969)

[Derek Washington

were nervous birds, however, and I continued with the blackfly in the hope that they were being taken after I left the aviary. On this day I found the chick with the deformed leg dead in the nest.

The remaining two young left the nest on 14th July. During the rest of the summer I gave supplies of all manner of wild seeds as these came into season. Both birds were successfully reared, and proved to be one of each sex and normal in colour. Both had slightly deformed toes on each foot. I kept the female to pair back to her father, and released the male.

In 1968 I moved house from Redhill to East Grinstead in Sussex. The three Sparrows were caged in February whilst their aviary was dismantled. On 21st April they were released into their new aviary. This measured 12 ft. \times 9 ft. \times 7 ft. high, approximately 3 ft. of the rear wall was boarded from ground to roof and attached to a 3 ft. square boarded section of the roof. The rear of the aviary was heavily planted with evergreen shrubs and some elderberry bushes. The aviary contained three Budgerigar nestboxes and a tit nestbox of a type known as the Upton permanent box (see British Trust for Ornithology Field Guide No. 3 "Nestboxes" by Edwin Cohen).

Other inhabitants of this new aviary were 10 finches of various species, a Collared Dove, and a Black-headed Gull with only one wing. There were a few differences from the previous year in the food available. All seeds were given dry, not soaked. Separate dishes contained British finch mixture, sunflower, peanuts, wheat, dove and pheasant mixture and wild seed mixture. Soft foods were also offered, again in separate dishes. These were soaked puppy biscuit, egg biscuit food and bread and milk sprinkled with calcium phosphate. As many wild seedling plants were offered as possible, species varying according to the season.

On 28th April the Upton permanent box contained some dead grass and the adult female Sparrow was seen to visit it. The male House Sparrow was very energetic, often displaying and chasing this, his original, mate. By 8th May a lot of material had been added to the nest and a lining, mostly of seed fluff, was being added. Three days later I added a daily supply of maggots to the diet.

On 18th May there were five eggs in the box, and the adult female was incubating. During the evening of the 25th I felt in the nest and the eggs were quite cool. I wondered if the hen had deserted, but on the 29th the rate of maggot consumption increased about four times, and on the following morning there were certainly young in the nest. That evening (30th May) there were four chicks and a clear egg. In spite of earlier difficulties I decided to ring these young with smaller than the recommended B₃ rings (inside diameter=3 mm) this time using the 2.6 mm B₂, as I knew the B₃ ring could be fitted on to adults. By 4th of June it looked as though there was another puppy fat problem, however, and to prevent further constriction I cut through the rings with fine

wire cutters, subsequently pulling them open sufficiently for removal using two pairs of surgical forceps. I tried fitting the larger B₃ ring on this day, but it would not go on. Next day I put on plastic Budgerigar split rings for identification. These were coloured green, blue, black and white.

On 7th June I measured the length of web open on the primary feathers as an indication of their stage of development. I also measured tarsus thickness to check on the puppy fat problem. The birds ringed black and white left the nest on 12th June, whilst Green and Blue fledged the day after. Further tarsus measurements were taken on 18th June, details are given in Table 1.

TABLE 1

Bird	7th June (probably nine days old)		18th June
	Length of web open on primaries	Tarsus thickness	Tarsus thickness
Green	5 mm	3.00 mm	2.60 mm
Black	9 mm	3.10 mm	2.75 mm
Blue	10 mm	3.00 mm	2.75 mm
White	12 mm	3.05 mm	2.95 mm

There was thus a reduction in tarsus thickness between the probable ages of 9 and 20 days of up to 0.4 mm. (Tarsus measurements were made to the nearest 0.05 mm using vernier calipers. Every effort was made to measure consistently to minimise experimental error). The results illustrate the puppy fat problem and give some measure of the difficulties faced when close ringing this species.

On 14th June, the day after the last young fledged, I noticed a drop in the rate of maggot consumption by about 30%; at the same time more bread and milk was being eaten. Two weeks later three of the young were seen feeding together on freshly gathered chickweed.

The young were all normal in colour.

All the Sparrows were nervous and would hide if they knew I was around. Sometimes though I could watch their behaviour from the house (about 80 ft. away) using binoculars. 16th June at about 11 a.m. was one such occasion when I watched the male and the breeding female mating. I did not see the start of this sequence, the unusual activity prompted me to fetch my binoculars. The female was on a sloping perch about two feet from the nest box, she was quivering her wings. The male flew round the aviary several times (clockwise if viewed from above), briefly pausing now and then on perches or on top of the nest box. He then quickly mounted the female from behind. During copulation she stopped quivering her wings, but the male flapped his vigorously as if to keep balance. They remained like this for only 2 or 3 seconds, then the male flew off for 5 to 10 seconds and returned and repeated the performance. This happened eight times in all. The female remained

stationary except once when she moved a couple of inches down the perch between matings. The female interrupted the sequence by flying away. Two days later the first egg of the second clutch was laid in the same nest.

The nest contained two eggs on 20th June (late afternoon) and four on the 23rd. July 1st still saw four eggs, but on the 5th there were four naked young in the nest. Late in the afternoon of the following day I watched the male eating bread and milk, he then flew to the nestbox and went in for about five seconds. There was much cheeping as he entered. When he left he flew straight to the female and the other young hidden in the shrubs. I noticed that the female always left the nest at this time if I went to the aviary.

On the 10th the four nestlings were well feathered and, once again, normal in colour; one was smaller than the others. Three days later I ringed them with Budgerigar split plastic rings—Red, Dark Green, Red & Black and Red & White. Next day I moved the 1st round to another aviary, and on the 18th the second brood left the nest.

On 21st July the smallest bird, Black & Red, was found to have inturned feet and pronounced fault bars across the tail (bars indicating a dietary deficiency at intervals during the growth of the feathers). On 5th August this bird was found drowned in the water dish. Red & White also had fault bars on the tail and one slightly twisted foot, the other two appeared to be perfect.

On 17th August Black and White (1st round birds) were moulting black bibs, and obviously were males. Blue and Green eventually proved to be females.

At the end of the month I could not find Dark Green (2nd round) or the mother, and realized that they must have escaped when the feeding hatch was left open accidentally a few days earlier. Green (1st round) seemed to be fittest female so I put her with her father on 14th September, having removed Red, Red & White and the 1967 bred daughter two weeks earlier. Having been without a female for two weeks the male was most excited at the introduction of Green. He chased her all round the aviary. Whenever he managed to perch near her he adopted a posture with drooping wings, open beak and a slightly fanned tail which he flicked up irregularly about twice a second. Several times the female clung to one of the wire netting aviary sides. This prompted the male to jump around her landing on the wire netting, as if forming a circle about three feet in diameter with the hen at the centre. At times she sheltered in a dense shrub, whereupon the male kept jumping to and fro along a nearby sloping perch. Unfortunately I did not observe, or did not record, the end of this activity.

I have no more relevant notes concerning these birds until April 1969 when I released all the remaining young except for the female, Blue, who was placed in a separate aviary as a reserve. On 28th April I discovered that Green had one egg in the Upton permanent box.

The food given was similar to that of the previous year as far as seeds, wild foods and maggots was concerned. However, I decided to experiment with the soft food to see if I could overcome the problem of some chicks having deformed feet. Instead of separate dishes of soaked puppy biscuit, egg biscuit food, and bread and milk sprinkled with calcium phosphate I made up the following mixture:— 1 part breadcrumbs, 2 parts puppy biscuit (Saval number 1), 2 parts chick crumbs, and 1 part Farex. To 1 lb of this mixture I added one teaspoon of calcium phosphate and half a teaspoon of Lusty's Pure Kelp Powder (rich in minerals and made from seaweed). This was moistened with water when supplied fresh daily.

On 10th May there were three eggs in the Upton permanent box, but the female seemed to have deserted them. The male no longer showed any interest in her, but he was often excited by wild females outside the aviary. I decided to add his other daughter, Blue, to this aviary, and also put in a new tit nest box. Next day the male was seen entering the new box, and a nest was being built in it on 18th May. By then there were only two eggs in the old box, both cold. I removed these and put them under a broody Canary. These eggs had a pale greyish ground colour, one was spotted and mottled all over with greys and browns, the other only had a little of this pattern at the thick end (the Handbook states that one egg in a set is usually much lighter than the rest). The fostering experiment was a flop as both eggs were clear.

On 26th May there was one egg in the new box; subsequently two more were added, but I did not discover which female had laid them. By 14th June these eggs were deserted, but Green had four eggs in the old box. One week later Green had one tiny chick and three eggs, whilst nest material was being placed over the eggs in the new box. Green's remaining three eggs failed to hatch, and the chick was eventually found dead on the ground. It was well feathered and normal in colour (this was the first offspring from the pairing dilute male \times daughter).

In 1970 I continued experimenting with the diet. I reverted to bread and milk sprinkled with calcium phosphate as the main soft food. This time however no maggots were given. Green had vanished by June and I presumed that she had died or escaped. On 3rd June Blue had five eggs in the Upton permanent box. One had hatched by the 12th, when I started giving about 40 mealworms daily. No other eggs hatched and the chick subsequently died as it was becoming feathered. This chick too was normal in colour.

In 1971 I added two pairs of Zebra Finches to the aviary. One pair nested in the Upton permanent box and I eventually found Blue dead wedged in the hole of this box. She appeared to be both going in and turning to get out. I suppose she was driven away by the Zebra Finch. As the Sparrow's corpse was like a cork in a bottle the poor Zebra Finch could not get out to feed, and she too was dead when I found them. Later

that year the old male Sparrow also vanished, bringing this experiment to a close.

I think the main point about the rearing of healthy undeformed young was that this only occurred when there was a plentiful supply of both maggots and bread and milk sprinkled with calcium phosphate. I do not know for certain that these are essential but I would use them again if trying to breed this species, except that I would probably use a multi-mineral/vitamin powder such as Vionate in preference to calcium phosphate.

Finally a few words on the failure to breed coloured or dilute birds may be of value. One fact which emerges is that this is not a sex-linked recessive type (as found in cinnamon Canaries for example). If it were sex-linked the dilute male paired to a normal female would have produced split dilute males and dilute females; however, all the females were normal in colour. If a non sex-linked recessive factor was involved all the young would have been split dilute, i.e. normal in colour, and young from the father \times daughter mating should include both dilutes and split birds of normal colour. The two young actually produced from this mating were both normal in colour, but such a small sample does not rule out the possibility of a non sex-linked recessive factor.

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A COLLECTION OF RARE BIRDS NEAR PARIS

By J. DELACOUR (Clères, France)

Some twenty miles north of Paris, at 'le Clos du Cédres', Mesnil Aubry, Dr. Henry Quinque has gathered an unusual collection of rare birds, particularly Parrots and Parrakeets.

Born at Limoges, he was initiated to aviculture by our late member U. A. Decoux who for many years maintained in the vicinity, at Géry, an outstanding collection of Parrakeets, Doves and small birds, often writing about them for this magazine. Dr. Quinque still keeps there the more usual species of Broadtails and other Parrakeets, in his mother's garden.

It is at Mesnil-Aubry, however, that he has installed his rarer birds.

The accommodation consists essentially of a vast block of 30 aviaries designed for Parrots. Each flight is 40 ft. long, 4 ft. wide and 6 ft. high and it has a heated shelter. They are elaborately built of steel and concrete, with all sorts of modern devices for the welfare of the occupants. A long indoor corridor and an open air one serve the aviaries at both ends.

Other aviaries are found in different parts of the grounds, inhabited by other Parrakeets and also by some rare passerine birds, particularly Rothschild's Mynahs, Red Birds of Paradise and a few others.

The small park surrounding the house is walled-in and has a large pond: Cranes, Flamingos and Waterfowl live there at semi-liberty, as well as a few mammals. A pair of Kagus inhabit an enclosure.

The following species of Parrots and Parrakeets are represented at present at Mesuil-Aubry:

Great Palm Cockatoo: A pair, plus a tame male, over 40 years old, which used to be U. Decoux's pet. *Gang-gang Cockatoo*: Three pairs in perfect condition, which have not yet started breeding. *Queen of Boavaria's Comure*: Several tame young specimens, recently arrived. *Amboina King Parrot*: Also several lately arrived. *Australian King Parrot*: Regularly breeding pairs. *New Guinean* and *Australian Crimson Wings*, also regular breeders. *Horned Parrakeet*: A male of this very rare New Caledonian species. *Uvea Parrakeet*: Two males of this rare species, one of which has produced hybrids with a female *Red-fronted Kakariki*, several pairs of which live and breed there. *Rock Peplars*: Regularly breeding. *Twenty-eight, Port Lincoln, Cloncurry* and *Brown's Parrakeets*. The latter reared a number of young, but Dr. Quinque has some difficulty in keeping them alive after the first six months. A fine pair of *Pesquet's Parrot* has recently been added to the collection.

Of the smaller species one finds a number of pairs of *Manycoloured Hooded* and *Naretha Blue-bonnets* which are breeding very successfully.,

Swainson's and *Scaly Lorikeets* are also present, as well as some wild-caught Cockatiels.

We hope that Dr. Quinque will soon report personally on his breeding successes with his rarer birds.

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BREEDING THE BLACK-HEADED SIBIA

(*Heterophasia capistrata*)

By RAYMOND FRANKLIN (Chesham, Bucks., England)

I obtained a pair of Black-headed Sibias, *Heterophasia capistrata*, from a Buckinghamshire dealer in February 1971. At first glance these birds are difficult to sex, but on closer scrutiny of this pair the hen has one or two pale grey primary feathers in the wings, and while the cock is bold the hen is much less tame. Both birds are mainly chestnut-brown, with black crests, and a long tail the feathers of which have grey and black terminal bars.

Their flight is short and jerky and they seem to jump from perch to perch like their relatives the mesias, *Leiothrix* species. They call continually with small babbling notes. The only time I heard what might be called a slight song was when they paired up before nesting. On a few occasions, associated with what appeared to be a nesting display, I heard a peculiar noise rather like a cat mewing two or three times in succession.

This was followed by the cock chasing the hen at a terrific speed round the aviary and in and out of a bamboo clump, and attempting to peck the cloaca of the female. Presumably this preceeds copulation. Cloaca-pecking in babbler courtship has been recorded for other species (Harrison 1967).

With regard to diet, all that I can persuade them to feed on are grapes, cut up small, and a continual supply of "nectar" which consists of honey, Complian, and Farlene Baby Food mixed with water. I have tried the usual proprietary soft foods but they refuse to touch any. Apart from insects which they "hawk" on the wing this is their basic diet. 1971 was a good year for wasps and they really relish these, it is fascinating to see them hold a wasp down with one foot and remove the sting. Sometimes they don't bother and just swallow the wasp whole.

After wintering them in the bird room (which is kept reasonably warm by electric heating in bad weather) they were put out into a flight in the second week of March 1971. The flight was 4m. \times 2m \times 2m \times and planting and planting with a clump of bamboo and some ferns.

They showed no interest in breeding in 1971. As with my Silver-eared Mesias, I overwintered them in the bird room with a pair of Spreo Starlings. On 12th March 1972, when the weather was rather cold, but fairly fine, I put them out in the planted flight again, but this year I fixed up a trellis in the flight and trained some wild hops to climb it.

In May I obtained some fibre from a Palm tree, the same material that the Silver-eared Mesia had used (Franklin 1972).

On 30th May the cock was seen to carry some of the fibres about the flight. On 10th June I saw him display to the hen with a long strand held in his bill, raising his crest and vibrating his wings. This went on from time to time until 16th July when I saw both birds commence to build high up in the clump of wild hops. By 24th July the nest appeared to be finished. It consisted of an outer layer of fibres, partly bound around the hops; then a thick layer of fibres interspersed with a number of bamboo leaves and other dead leaves, and within this a deep cup lined with fibre. It was about the size of a Blackbird's nest, *Turdus merula*, but with a smaller and deeper cup.

On 25th July I saw the cock chasing the hen at terrific speed, calling loudly and making the peculiar mewing noises. Copulation was not observed. On 28th July, when I saw the hen leave the nest, I examined it with the aid of a mirror and could see one egg, rather like that of a Greenfinch in size and colour.

Both birds shared the incubation, which lasted 14 days, with one young one hatching on 12th August. The following day another young one hatched out, and because the hen is not so tame I kept out of the flight for fear of upsetting her. From then on it was a case of supplying as much live food as possible. This meant going out into the fields every day with a large net to catch flies. Luckily the weather during this period

was rather hot, and this made it easier for me since the parents were able to catch plenty of live food in the flight.

I would have preferred to let the birds come out at liberty to collect food, but as I have a Siamese cat I thought the idea might be a little imprudent. On 28th August the two babies came out of the nest, the feather colouring being the same as that of the adult birds. They roosted apart from each other and unfortunately the weather became a little chilly. They both died at two days out of the nest.

The parents appeared to be mating again at about 30th August, but nothing came of this, and I brought them back into the bird room on 15th October. This year (1973) they have gone into a large planted flight and I am hoping for better results.

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FURTHER OBSERVATIONS ON THE TOURMALINE SUNANGEL HUMMINGBIRD

By A. J. MOBBS (Walsall, Staffordshire, England)

Since writing the notes on the Tourmaline Sunangel, *Heliangelus exortis*, which appeared in Vol. 79 : 79-83 of this magazine. I have learnt from personal observation, that the species will in fact roost on one foot.

For two weeks I purposely entered my birdroom before the birds had awakened from their night's sleep, and each time I found the Sunangel using the left foot only to grip the perch. It is surprising the bird uses the left foot during the night period, because as already mentioned in my previous notes, the right foot is favoured during the hours of daylight.

Since writing my previous notes, I have also had the opportunity to examine male *H. exortis* both in juvenile and post-juvenile plumages. The juvenile plumage resembles that of an adult female except for the white patch on the chin and lower throat which in the juvenile male is smaller and speckled with green. Male's in post-juvenile plumage resemble the adults but are shining rather than glittering green on the chest. As with the adult male, the chin and upper throat is violet-blue and the lower throat is red. However, although these feathers are somewhat iridescent, they are not so brilliant as in the adult bird, nor are they as pronounced. In the post-juvenile plumage, there is a faint white line running along the bottom edge of the red of the lower throat. The tail feathers in the post-juvenile male, although longer than that of the juvenile bird (and the female), are not so long, nor as deeply forked as in the adult bird.

COLOURFUL PLUMAGE IN TROPICAL BIRDS

By RONALD I. ORENSTEIN (Division of Birds, Museum of Zoology,
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In a recent paper in *AVICULTURAL MAGAZINE*, Willson and von Neumann (1972) draw attention to the higher proportion of colourful birds in the tropics than in the temperate zone, but are unable to suggest any general hypothesis to explain this phenomenon. A reexamination of their data, however, shows that the problem can be at least clarified by separating the colourful birds in the tropics into two groups: those which have developed colourful plumage for the same reasons as temperate species (and presumably have the same proportion of colourful forms), and those which have developed bright colours in response to purely tropical conditions. Birds in the latter category would be expected to belong to groups absent in the temperate zone, and the addition of such groups to the fauna would then account for the increase in the proportion of brightly-plumaged birds in the tropics.

That such a division does occur (as opposed for any general tendency for birds to be more colourful in the tropics) is indicated by a consideration of groups with wide latitudinal ranges. The following table, drawn from the appendix to Willson and von Neumann's paper, compares the proportions of colourful birds in families having representation of 10 spp. or more each in temperate North America and in South America.

	<i>North America</i>	<i>South America Tropics</i>	<i>South America Nontropics</i>
Accipitridae	0/23 (0%)	0/36 (0%)	0/11 (0%)
Columbidae	0/11 (0%)	0/26 (0%)	0/15 (0%)
Trochilidae	15/15 (100%)	84/133 (63%)	72/96 (75%)
Picidae	8/22 (36%)	8/72 (11%)	<10 spp.
Tyrannidae	3/31 (9%)	15/202 (7%)	0/106 (0%)
Corvidae	6/15 (40%)	7/11 (64%)	<10 spp.
Troglodytidae	0/10 (0%)	0/28 (0%)	0/11 (0%)
Turdidae	6/13 (46%)	0/20 (0%)	0/12 (0%)
Vireonidae	1/12 (9%)	2/19* (11%)	<10 spp.
Parulidae	25/53 (47%)	21/27 (78%)	10/21 (48%)
Icteridae	11/20 (55%)	30/48 (63%)	8/15 (53%)
Fringillidae	16/77 (21%)	20/112 (18%)	19/73 (26%)
TOTAL	91/302 (30%)	187/734 (25%)	109/360 (30%)

It is apparent from the above that in most families there is no tendency for the proportion of brightly coloured birds to increase in the tropics. The exceptions are the Corvidae, Parulidae and Icteridae. The higher proportion of colourful corvids in the New World tropics is almost certainly a reflection of the absence of the genus *Corvus* in South America. Parulids also show a decrease in diversity in the tropics. The largest genus of the family in tropical South America is *Basileuterus* (11 of the

19 species) whose members, although many have yellow underparts or well-marked crown patches (6 spp. at tropical elevations) and are therefore colourful by Willson and von Neumann's standards, strike the observer as much less brilliant than most North American species (data from Meyer de Schauensee 1970, which excludes Central American species).

The highest proportions of colourful species in the New World tropics, as listed by Willson and von Neumann, are found in the Psittacidae (100%), Trogonidae (100%), Momotidae (100%), Galbulidae (100%), Capitonidae (100%), Ramphastidae (100%), Parulidae (78%—but see above), Coerebidae (74%), Bucconidae (67%), Corvidae (64%), Thraupidae (64%), Trochilidae (63%), Icteridae (63%), Pipridae (51%), and Cotingidae (28%) (ignoring the Cathartidae). Most of these families have poor representation or are absent in temperate North America. More important, they represent ecological types largely confined to the tropics. Most are obligate or almost obligate frugivores (e.g. Psittacidae, Trogonidae, Capitonidae, Ramphastidae, Pipridae, some Cotingidae, Thraupidae, some Icteridae (e.g. *Icterus*)) or nectarivores (e.g. Trochilidae, Coerebidae) (Haverschmidt 1968, Thomson 1964). These feeding types are rare in temperate latitudes, presumably because the stronger seasonality restricts the availability of fruit and nectar during much of the year. A similar correlation between diet and plumage holds in the Old World, where many of the brilliantly coloured species are frugivorous (e.g. Psittacidae, Musophagidae, Trogonidae, Capitonidae, Paradisaeidae) or nectarivorous (e.g. Psittacidae (Lories), Dicaeidae, Nectariniidae) (Thomson 1964, Gilliard 1969). Contrasted with this is the failure of the large families of insectivorous birds in the tropics (e.g. the Dendrocolaptidae, Furnariidae, Formicariidae and Tyrannidae in the New World, and the Sylviinae and Timaliine complexes in the Old) to produce more than a few colourful species. As a further indication that frugivory and bright or striking plumage tend to be correlated, in the Cotingidae and the closely related Pipridae those genera with bright colours or ornamental plumage (e.g. *Phoenicercus*, *Cotinga*, *Xipholena*, *Iodopleura*, *Haematoderus*, *Querula*, *Perissocephalus*, *Gymnodoera*, *Procnias*, *Rupicola*, *Pipra*, *Xenopipo*, *Chiroxiphia*, *Manacus*) are obligate or primarily frugivores, while those with more dully-coloured plumage (e.g. *Attila*, *Laniocera*, *Rhytipterna*, *Lipaugus*, *Pachyramphus*, *Platypsaris*, *Tyranneutes*, *Schiffornis*, *Neopelma*) are largely insectivorous (Slud 1964, Haverschmidt 1968). Similar cases exist in the Old World, where the fruit-eating pigeons of the genus *Ptilinopus* are the most colourful in the family, and in the Drepaniidae of the Hawaiian Islands, in which the largely nectarivorous genera *Drepanis*, *Ciridops*, *Palmeria*, *Vestiaria* and *Himatione* are generally more colourful than the insectivorous or granivorous genera *Loxops*, *Psittirostra*, *Pseudonestor* and *Hemignathus* (the exceptions being the black *Drepanis funerea* and the red *Loxops maculata flammea* and *L. c. coccinea* respectively). (Amadon 1950).

There are several possible reasons why frugivorous and nectarivorous birds are likely to be brightly coloured. Firstly, food items for such birds are more likely to be concentrated in circumscribed areas—i.e. single fruiting or flowering trees—than is the case for insectivorous or granivorous species. This tends to bring the birds into close physical proximity during feeding, and may as a result increase aggressive encounters. Humming-birds, for instance, are highly aggressive, as are the nectarivorous Drepaniids in Hawaii. The Iiwi (*Vestiaria coccinea*), the most brilliantly coloured of the latter family, is also one of the most pugnacious (personal observation). Frugivores are apparently less overtly aggressive than nectarivores. The presence of bright colours in both groups, however, may provide more striking aggressive signalling patterns and as a result contribute to the spacing of individuals at feeding sites. Secondly, the utilisation of a food source, such as fruit or nectar, that can be gathered with a minimum amount of search may free the male from the necessity of assisting the female in parental care, and as a result promote the development of polygamous mating systems in which the male mates with a wide variety of females instead of forming a pair-bond. In such birds the male normally develops brilliant colours and/or ornamental plumage for use in display. The first factor mentioned above may be more important in those forms in which both sexes are brightly coloured (e.g. *Ptilinopus* doves, Psittacidae, Capitonidae, Drepaniidae, many Thraupidae); the second applies to such groups as Paradisaeidae, Pipridae and *Rupicola*. The two factors are not necessarily mutually exclusive; many humming-birds have polygamous mating systems and are highly aggressive at feeding sites.

In addition it should be pointed out that many of the birds considered are birds of edge and forest canopy (presumably as a result of the distribution of their food sources), and that bright colouration may render birds most inconspicuous against the brilliant greens of tropical rainforest foliage. Again, this is not a contradiction of the above-stated explanations; a bird which might be inconspicuous to an aerial predator, viewing it from above, may be quite the opposite to a conspecific at its own level in the canopy. As an example, in many of the *Ptilinopus* doves the back is bright green while the head and underside carry distinctive markings in other colours. Thus these birds would present a completely different aspect when viewed from below or on the same level—as a conspecific might see them—than they would viewed from above against a green background.

The evidence, as reviewed above, is thus against any general tendency for birds to be more colourful in the tropics than in temperate latitudes. It seems probable that the primary reason for the larger number of colourful birds in the tropics is the addition to the avifauna of nectar- and fruit-eating groups not found in the temperate zone. Admittedly other special factors may be present in the tropics; for instance, the

Momotidae, Galbulidae and Bucconidae are not frugivorous but do represent feeding types absent in higher latitudes. Probably there are a wide variety of reasons for the evolution of bright plumage, but for many groups the explanations will be equally applicable in the temperate zone.

Dr. H. F. Recher gave useful advice and comments during the preparation of this note; Drs. F. Talbot and J. Kikkawa criticised the draft manuscript.

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NESTING OF THE KEA, *NESTOR NOTABILIS*, AT JERSEY ZOO

By MARGARET MALLET (Bird Section, Jersey Wildlife Preservation Trust)

The Kea, *Nestor notabilis* is found in the South Island mountain areas of New Zealand, with a more extensive range than in the latter half of the last century, in spite of the massive toll taken by sheep farmers. They nest on the edge of the high level forests and obtain food from the forests clothing the mountain valleys, ranging widely to the alpine grasslands for Autumn fruits. During wintertime their natural curiosity and lack of food brings them further down the mountains to human habitation levels, where they tend to annoy the local population by their destructive habits, which include pulling tiles off roofs, chewing window frames and even entering houses and helping themselves to objects which take their fancy.

This provides entertainment for the tourists, but they too can suffer the disadvantages of these birds' curiosity and boldness, since they are not averse to hopping into cars and creating the same sort of havoc that they do in houses.

In May 1963, a pair of keas was presented to the Jersey Zoo by the New Zealand government and a second female arrived the following August. All three were housed in an aviary, the dimensions of which are approximately 30 ft. × 12 ft. × 9 ft. high with a shelter provided at the

rear, under which are two large barrels, about four feet from the ground; the birds use these to sleep on but very seldom go inside them. In the centre of the aviary is a large mound of granite rocks and logs and wedged amongst these is a metal container for bathing and drinking. Ample perching is provided and fresh branches are given daily—Willow being the most acceptable. The area under the shelter is sanded and the remainder of the aviary is grass.

Their diet consists of sunflower seeds, peanuts, omniverous nuts, hardboiled egg (of which only the yolk is eaten) and any fruits and vegetables in season. Added to this are the staple, oranges, apples, bananas, plus dates, fresh coconut, figs, melon, chicory and lettuce. They also eat kidney, but are more enthusiastic about it during the breeding season, and brown bread soaked in a nectar mixture is always the first item to be eaten. Their lettuce is usually taken straight to their water container and “dunked” several times before it is consumed, but I have not seen them give the same treatment to any other item of food except for their carrot. The young keas on the other hand, spent a great deal of time around their water bowl and a large amount of their food was to be found at the bottom of it each morning.

In December 1965, a wooden “T” shaped nest-box was installed, but although it was thoroughly inspected at the time, no great interest was shown in it until the beginning of January 1966, when the male and female began spending a large part of their time in it. The second female was always driven away if she attempted to enter, and if she succeeded, was promptly chased out again after a brief bout of squabbling, but once clear of the tunnel entrance, was left to her own devices and at no time was she bullied by them. Eventually, she was seen to spend most of her time at the front of the aviary although they all fed from the same dish. However, by the end of February, it was obvious that no serious attempt at nesting was to be made that year, and by the end of the month all three were amicable again.

In the years 1967, 1968, 1969, 1970, 1971 and 1972, four, five, four, seven, seven and seven eggs were laid respectively, the majority of which were fertile. Several of these disappeared during the latter part of incubation and we had strong reason to suspect that the male was responsible for this, since whenever he went to feed the female, a good deal of squabbling was heard before she chased him out of the box, although he was never actually seen to take an egg. In order to cut down the losses as much as possible, each egg was removed as it was laid and replaced with one from a bantam and put back a few days before they were due to hatch. Some chicks were hatched during these years, but none survived for more than 48 hours, and an unsuccessful attempt was made to hand-rear one in 1970.

The second female did not appear to be a disturbing influence on the pair during the breeding season, but nevertheless, it was decided to remove her to a small cage some distance away, and to make another one for the

male kea which was built at the back of their aviary. So at the beginning of the 1972 season, the odd female was taken out, and when the clutch of seven eggs was completed, the male was shut into his quarters where he could still have contact with the female and eventually the young. Unfortunately, during the time the pair were together, to ensure fertilisation one egg disappeared and one was found damaged at the entrance of the nesting area, leaving a clutch of five.

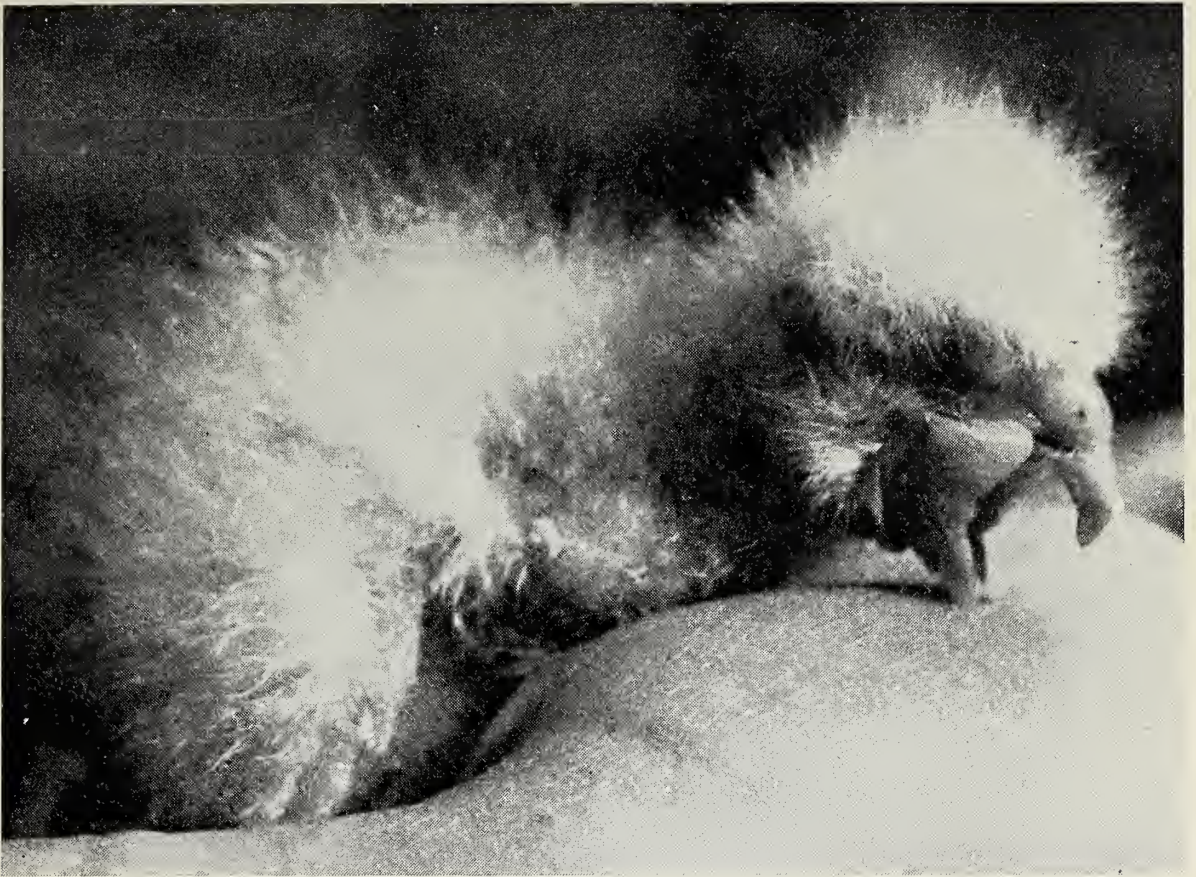
An interesting point is that a kea clutch in all accounts, only consists of four eggs, maximum, yet on three occasions our female has laid seven eggs and once five. On several occasions she has laid one or two eggs and then stopped for a period of about a week before starting again and laying every two or three days. This has inevitably meant a long gap between the laying of the first and last eggs, another reason for taking them away and putting them back once she has started to sit. Therefore, the first eggs were sometimes placed under pigeons and it was a chick from one of these fostered eggs that we attempted to hand-rear.

In 1972, incubation commenced on the 16th February and on the 11th March, the first chick had hatched, Nos. two, three and four hatching on the 12th and 14th. The fifth chick was unfortunately dead in shell. On hatching, the chicks are covered in white down, with large sack-like structures at outer edges of their beaks, giving them a rather grotesque appearance.

Beaks, legs and areas of skin around the eyes are pale pink for the first few days, gradually changing to a greyish green, and eventually turning to a clear yellow at the age of about eight weeks, except for the beaks and legs which turned black. This colour is retained for at least two years, and probably until they approach maturity at four to five years.

The chicks were checked daily and at all times had full crops and stomachs, the first food to be seen in their crops being carrot. Our Keas and also those at Zurich, are very partial to chicory and during the rearing of their chicks were given three a day. It is customary for the male kea to feed the female while she has young, but since our male could not do this by going to the nest box, he used to feed her through the wire of his cage, whereupon, she would go straight back and feed the chicks. Three feeds a day were given at this period, one of which was placed in the tunnel to the nesting area.

On 17th March one dead chick was found in the tunnel and we had a few anxious days wondering if they were suffering from some contagious disease, but the remaining young continued to grow rapidly and on the 5th April, the first pin feathers could be seen along the edges of their wings. By the second week in May they were fully feathered and although they would venture along the tunnel, they were not seen in the aviary until the 26th May, but since they seemed very timid it is probable they had been out at night-time before that date; once they realised they were being observed, they would dash back to the safety of their nest-box.



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Kea one day old

[Phillip F. Coffey



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Kea 24 days old

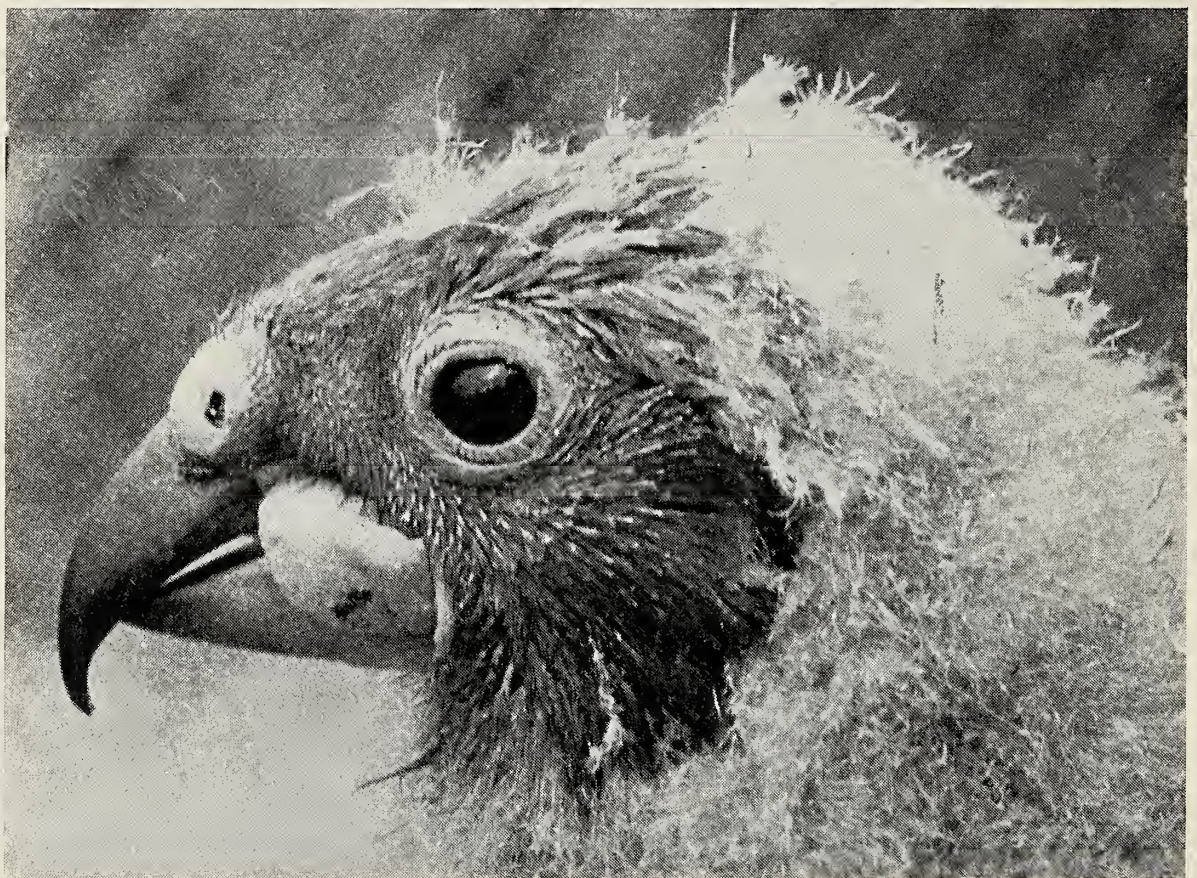
[Phillip F. Coffey



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Keas 24 days old

[Phillip F. Coffey



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Kea 32 days old

[Phillip F. Coffey

As they became more confident and spent longer periods outside, it was easier to note their behaviour and they and their father appeared to take great interest in each other, but he was not seen to feed them until several weeks later.

The male kea was released from his cage on 15th June and rapidly settled into family life, although for the first three days he was put into his quarters at night. No antagonism was observed from him towards the young ones, but neither did he appear to take any great interest in them; it is possible that the female could have been partly responsible for this since she was the dominant party at this period and would not tolerate him anywhere near her, and it was with her that the young spent a great amount of their time.

The timidity they displayed at their debut, rapidly diminished, and by the beginning of July, one in particular had become most confident and friendly; this specimen was heavier in build than the other two, with a longer curved beak and his sex was tentatively determined as a male. He readily took food and play objects from my hand, and took great delight in dropping my rubber gloves in the water container until, at the risk of offending him I decided to terminate this practice, but he still derived great pleasure from trying to pull them off my hands. He also enjoyed playing with my clothes, tugging at a leather belt, boots and most of all emptying the rubbish bucket by tossing everything out with his beak. The other two would watch these activities with great interest, occasionally attempting to wrest a plaything from him, but since he was the dominant one, they usually had to wait until he lost interest in it, and even the objects they took from my hand, he quickly commandeered. Robert Keller observed the behaviour of this group of Keas during the latter part of June, and it is due to him, I am sure, that the young keas and I derived so much pleasure from each other's company, since he advised that spending as much time with them as possible could be nothing but advantageous to all of us.

On the 25th October one pair of the young keas was sent to Paignton Zoo, and later the single female to Chief Officer of the Parks Department, London.

In the current year (1973) they are again nesting successfully, with three young hatched. This time the male has been permitted to remain with the chicks since hatching and his behaviour has been exemplary. We believe this is due to a second nest-box having been installed and his having somewhere to go during incubation apart from the nesting area.

* * *

NOTES FROM SLIMBRIDGE

S. T. JOHNSTONE (Stroud, Glos., England)

At Slimbridge, the Wildfowl Trust has its major collection of waterfowl, screamers and flamingos. This concourse of birds is the largest and most comprehensive collection of one group of animals in the world and its has been my privilege, over the last twenty-six years to collect them together and to create their environment.

I came to Slimbridge with a medical training and a knowledge of architecture and building construction. My acquaintance with waterfowl was to say the least, limited. But I was fortunate in having as my boss, Sir Peter Scott, whose enthusiastic support and encouragement has made the project so worth-while. Furthermore I was lucky in the early days to be under the tutelage of that great and unassuming aviculturist, John Yealland.

Apart from the passerines in the Tropical House, there have been over this period 197 forms represented of which 163 produced eggs and 152 kinds have been reared. It is difficult to be sure of first records, but it is believed that 14 of these were reared for the first time in captivity and 27 in Britain. One of the attractions of New Grounds is the wintering flocks of wild swans, geese and ducks and ample facilities are given to our members for viewing these birds at close quarters, and without too much difficulty. There are six towers of varying heights, some fitted with powerful binoculars, numerous hides, and a very comfortable observation room, adjoining the hostel, where one can view the winter population of Bewick's Swans, together with numerous Pintail, Wigeon and Shoveler.

For many years the collection was kept in an area of some thirty-five acres and this posed particular problems regarding the segregation of the more aggressive species and finding fresh grazing annually for rearing the young birds. However, in 1972, we were able to expand and the new development has made it possible to fox-proof 100 acres. It was intended that the extension should include a Nene park, swan pens, Mallard aviaries, and further heated quarters. There would also be additional grazing for flocks of fifty or more geese of individual species. An eleven acre field has also been fenced close to the propagation centre for rearing purposes. An additional water supply was planned to be supplied by means of Well Points.

For the collection the amenities are many. There are four series of aviaries and perhaps the most interesting are those adjoining the propagation building, which are built on the principle of the tent pole. Steel hawsers, tensioned by means of bottle screws, rise upwards and forwards from the seven-foot-high shelter to a point fifteen feet above the observation path and held in position by steel scaffolding poles. This structure is covered with half-inch wire netting and provides a flight space

some twenty feet long. Each partition has a pond with flowing water and a winter-house with infra-red heat and a tapped water supply.

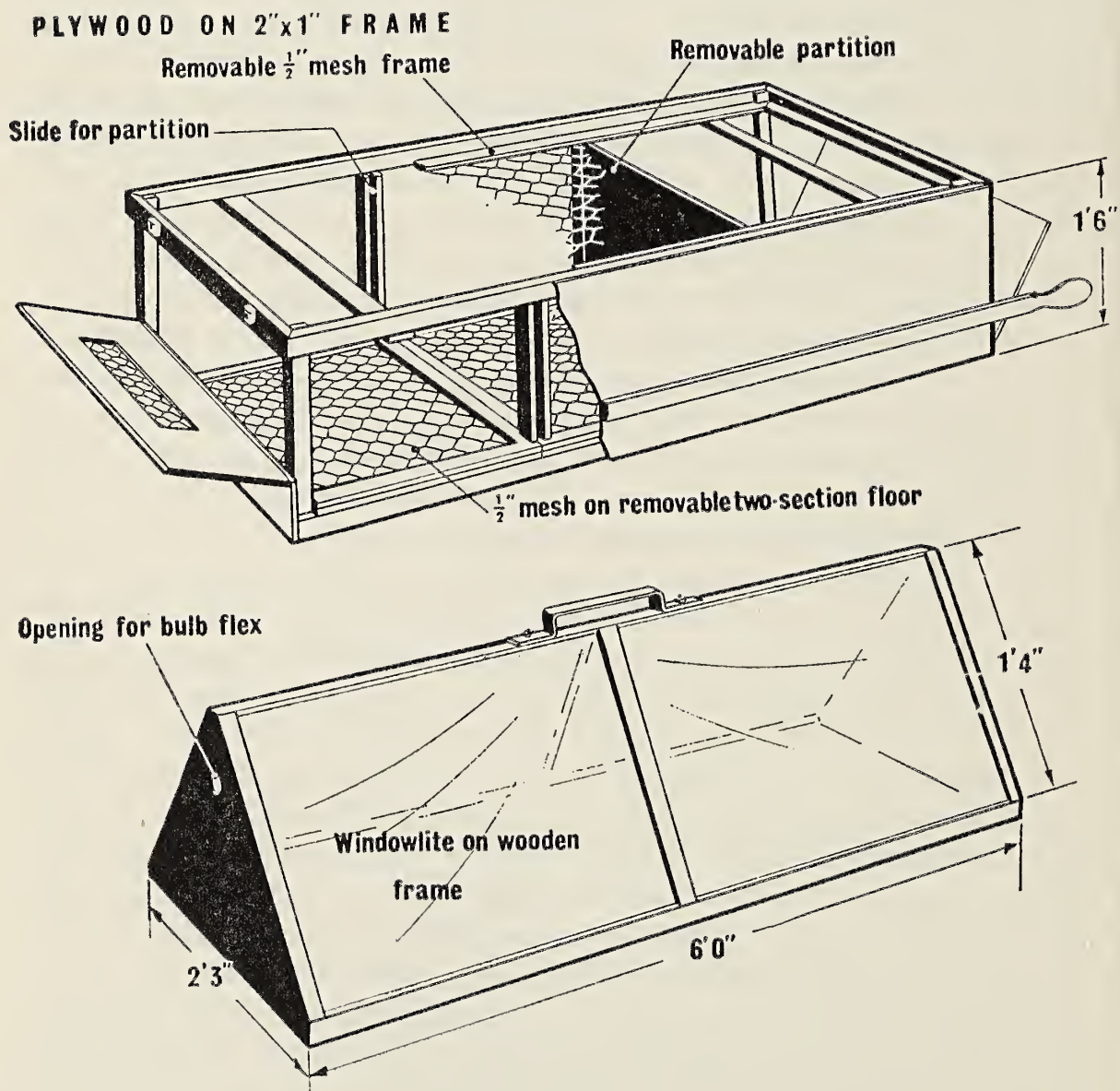
The Guinness Aviary is eighty yards long and is constructed of semi-circular frames of tubular steel with a radius of twelve feet. Each section has an external pond with flowing water and a heated house with separate water supply. This structure was presented to the Trust some fifteen years ago by the famous Dublin Brewery. Since that time among the rarer birds to breed therein were Spotted Whistling Duck, New Zealand Brown Duck, Hartlaub's Duck and White-winged Wood Duck.

The other two rows of aviaries are of the conventional type with flat roofs and wooden frames. Both have external and internal water-ways with flowing water and infra-red heat. They are used principally for rearing full-winged birds and for wintering the more delicate birds in the collection.

The Propagation Centre has recently been rebuilt through the generosity on an anonymous benefactor. The building contains food silos, rooms for milling food, food preparation, insect propagation, incubation, surgery and X-ray. There is on the first floor a large work shop and store room together with a staff recreation room. Half the ground floor is devoted to an indoor rearing unit. Here there are some forty raised pens, each virtually one yard square with plastic and wire-netting floors and roofs. The partitions are removable and are wooden. The pens can therefore be altered in size to suit the number and size of the young birds. Each is supplied with an infra-red lamp adjustable for height, and a plastic mat the latter being from the hygienic point of view far more easy to clean than sacking. The floor of the unit is in rendered cement and is washed down daily. Originally intended for the more delicate species without foster mothers, it has been found that the installation is extremely useful for all species, particularly when weather conditions are bad.

In the early days, in fact for the first seven or eight years, there was no electricity at New Grounds and the natural flow of water was very, very slow. At this time the young were reared on an 'S' bend of water leading into the top pond of the Rushy Pen. However, with the arrival of power, I constructed a prototype duckery with a water course where the water flowed over a step from pen to pen. There were three rows of pens, but the last pen in each row had water from all the others in the row. This was hardly the basis of good hygiene. In consequence a further duckery was built. Here water, pumped up from water bearing sand 20 ft. below the surface, is fed into a raised header channel to three rows of pens. From the header channels water is fed into a shallow, wide, cement-lined ditch to each of the pens. In one row the ditch is widened out to deeper ponds for the diving ducklings. The water leaves the pens by means of waste drain, whence it flows into a disused rhine. The pens are some 150 sq. ft. in area and at the height of the breeding season can be sub-divided to accommodate the thousand young birds that are reared

annually. The water supply to each pen is controlled by a wooden tank and the 3500 gallons per hour supply is found to be adequate for this purpose. There is a power supply available to each pen. Weather conditions permitting and provided the downies are feeding satisfactorily, they are moved from the internal to the external duckery about the fifth day where they are installed in one of the rather sophisticated brooders that I first built some fifteen years ago and which have been gradually modified as experience with their use has proved necessary. The alterations have been principally in the reduction of length from six to four ft. and in making the handles detachable for the purposes of easier handling and storage. Swans, geese and ducks, with or without a bantam, are reared with equal facility in this type of brooder.



Other facilities for the captive birds include a recently constructed sea-duck pool. This consists of three ponds at different levels and connected by rocky cascades. The highest is at eye-level, the middle at waist, and the lowest at ground-level. The middle pond is retained by a Cotswold stone wall and here visitors can approach close to the birds, which are fed on stone shelves projecting from the interior of the wall at water-level. The water supply is pumped into the top pond by means of a well-point system. It was hoped that the cold fresh water pumped up from below ground would also be clear, but unfortunately due to the high iron content it is translucent rather than transparent and in consequence the proposed underwater window has not been installed.

The Tropical House was another project sponsored by a generous benefactor. It has a floor space of 2700 sq. ft. and a maximum height of 15 ft. At least two thirds of the floor space is water. There are three ponds connected by waterfalls, one relatively large with the surface five ft. above the ground. It is fed by a waterfall from almost roof height. Water circulates from here through the two ft. high centre pond into one at ground-level. Thence it is pumped back again over the top waterfall. Originally filled from the mains the water is circulated twenty-four hours of the day. The walls, a cavity structure with an internal skin of Therma-lite blocks and a double roof of transparent plastic were erected through the kindness of two members of the Trust. The Royal Botanical Gardens, Kew, supplied the plants and advised on planting. All the internal construction, rock-work, ponds etc. were carried out by the staff. The building is kept in winter at a temperature between 65 and 70°F by means of Wanson Thermopiles, hot air heaters, in duplicate (in case of failure). A Lister generator cuts in automatically in case of power failure. There is a sprinkler system to simulate tropical rain and a lighting system to increase the hours of light during winter months.

The '*raison d'être*' for the tropical House was the hope of breeding the Pigmy geese. Unfortunately, up to the time of my retirement, the only waterfowl to breed there were the Hottentot Teal. But having produced suitable conditions, it was decided to try our hand with some passerines. And Hummingbirds, Tanagers, Pittas, Sun Bitterns and Roulrouls were tried.

The Brown-breasted Hummingbird (*Amazillia castaneiventris*) laid on several occasions, but the eggs were infertile and it was never certain whether the birds were a pair. The Brown Violet-eared (*Colibri delphinae*) nested and reared a chick paired to a male Sparkling Violet-eared (*Colibri thalassinus*). The Golden Tanager (*Tangara arthus*) and the Blue-necked (*Tangara cyanicollis*) both reared young as did the Blue-winged Pitta (*Pitta moluccensis*).

Giant toads and Geckos were introduced with a view to controlling a cockroach infestation but with little success. The fish in the ponds include Silver and Grass Carp, Swordtails and Guppies.

Apart from the conservation story of the Hawaiian Geese, which must by now be well known in avicultural circles, the Trust has embarked on a similar project with the White-winged Wood Duck (*Cairina scutulata*) regarded as a much endangered species. There were at Slimbridge several pairs of these birds some fifteen years ago and they lived for several years but never showed signs of breeding.

In 1970, with the aid of the World Wildlife Fund, two consignments of birds were caught in Assam and sent to Slimbridge. These were paired and put into the larger sections of the aviaries; some pinioned and some left full-winged. Nesting-sites in the form of kennels and open-topped boxes were placed 10 ft. high, 2 ft. high and on the ground, 4 alternatives being offered to each pair, though the highest site was omitted in the case of the pinioned birds. In each case a kennel was placed on a log in the winter shelter. Of the 3 clutches laid in 1971 and 1972 two were by a full-winged pair and one by a pinioned pair. The latter and one of the former were in the kennel in the winter quarters. The other of the flighted pair was high up in a willow. The clutches were large, 12 to 14, and the eggs similar in size and shape to that of the Muscovy Duck though they were somewhat darker in colour. The incubation period would seem to be between 32 and 34 days. I issued an edict that the birds were not to be disturbed and the nest not examined until the parent appeared on her pond with the brood. Incubation period and clutch number could wait until the birds were more firmly established. The hatches were successful and in due course the broods appeared on their ponds. It was found that the males spent their time 'dunking' the ducklings and to prevent any drowning they were removed to a separate aviary and not returned to their females until the young were fully feathered and had left their mother. Some twenty birds have been reared in the last two seasons. The downies were patterned and coloured like young Mallard, being brown and yellow, a characteristic feature was noted in the way the post orbital stripe turned up at an angle to join the dark cap. Like all cairinini the tarsus was duo-coloured in this case brown and yellow. The juvenile plumage was dark brown where the adult was black.

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THE PLIGHT OF THAILAND'S BIRDLIFE

By RICHARD MARK MARTIN (Padstow Bird Gardens, Padstow, Cornwall, England)

I know that most sincere aviculturists, in spite of what many conservationists say, are really very concerned about the state of wild populations. People keep birds privately because they love them, not because they want to exploit them.

Of course, there are the exceptions—every trade, profession and calling has its black sheep—but notwithstanding this, I feel certain that what shocks me as a conservationist *and* aviculturist will also shock 90% of my fellow enthusiasts, or at least I sincerely hope it will. A friend of mine, H. Elliott McClure, who is ornithologist with the American Migratory Animal Pathological Survey in Thailand (which is a branch of the U.S. Forces, and works in conjunction with the Applied Scientific Research Corporation of Thailand) has just sent me a report published by the Thai Government.

It is entitled *Animal Exportation From Thailand In 1962-71*, it runs to 22 pages and deals with mammals, birds and reptiles. It is, to my mind, both an important and horrifying publication which demands to be read by all who love Oriental wildlife. It does not set out specifically to shock, in fact, if anything, an opposite inference comes through. The opening words of the Introduction read as follows:

Wild animals make up one of the natural resources of the country which are of value to the economy, education and recreation of the people. In the past, Thailand has received millions of Baht income from the exportation of wild animals alone. Many species are in demand and therefore commercial business dealing with wild animals seems to be a real promising one. This has also been beneficial to the circulation of Thai currency within the country.

What follows is true; it is happening now. And in writing this, I sincerely hope that it is not taken for a personal attack on aviculture or aviculturists because it is certainly not intended as such. I merely feel that readers of this journal have a right to know what is going on, and will find the following stimulating and form their own opinions as I have done. The faults lie within the "system": the fact that Thailand is a poor country; the fact that it is (or was) very rich in exotic wildlife; the fact that it is inhabited by Orientals; and, let us be truthful, the fact that world demand (essentially European and American) for tropical animals has proliferated out of all proportion in recent years.

It should be borne in mind that the report is only concerned with those animals which left the country legally via the Don Muang Airport. I emphasise that it does not include animals which have been brought out illegally, and as the report points out: "This [higher priced] group has often been smuggled out for profit".

In 1967 the Royal Forestry Department set up a Wild Animal Inspection Office at the airport, and so data since then has been much more detailed. For the earlier period (1962–6), data was gathered from the records of the Department of Foreign Trade, and is so peripheral that we can almost ignore it. Perhaps the most interesting facts to emerge for that period with regard to birds are that 549 Roulroul Partridges (*Rollulus roulroul*) were exported with the peak being 192 in 1963; 336 Great Argus Pheasants (*Argusianus argus*) were exported, the peak being 126 in 1964, since protection in 1966 their export has been banned. Of the other pheasants, 424 were exported; so were 437 hornbills—of which over half were members of the Great Hornbill species (*Buceros bicornis*).

These figures do little to prepare one for what is in store, for no mention is made of the more popular species. Incidentally, in the same period, as many as 45,799 monkeys (*Macaca* spp.) were likewise dispatched.

In the table I have listed each species or group of which more than 100 were exported in the five years from 1967–71 together with a few especially interesting types of less than that number.

SPECIES	Number exported					TOTAL
	1967	1968	1969	1970	1971	
Egrets (<i>Egretta</i> spp.)	13	79	13	172	366	643
Ducks (<i>Anatidae</i>)	—	13	17	91	395	516
Kites, hawks, eagles (<i>Accipitridae</i>)	609	714	733	1,184	2,571	5,811
Goshawks (<i>Accipiter</i> spp.)	—	—	—	133	—	133
Falconets (<i>Microhierax</i> spp.)	—	554	1,304	840	515	3,213
Pheasants (<i>Lophura</i> spp.)	214	107	59	74	227	681
Green Peafowl (<i>Pavo muticus</i>)	3	4	20	28	123	178
Roulroul (<i>Rollulus roulroul</i>)	94	99	104	86	192	575
Hill Partridges (<i>Arborophila</i> spp.)	38	51	276	344	249	958
Francolin (<i>Francolinus pintadeanus</i>)	20	—	27	68	356	471
Painted Quail (<i>Cortunix chinensis</i>)	115	1,195	852	329	2,944	5,435
Button Quails (<i>Turnix</i> spp.)	35	10	—	693	425	1,163
White-breasted Waterhen (<i>Amaurornis phoenicurus</i>)	22	46	—	9	85	162
Purple Gallinule (<i>Porphyrio porphyrio</i>)	3	5	11	109	269	397
Bronze-winged Jacana (<i>Metopidius indicus</i>)	—	8	6	45	59	118
Pheasant-tailed Jacana (<i>Hydrophasianus chirurgus</i>)	—	—	6	5	77	88

SPECIES	Number exported					TOTAL
	1967	1968	1969	1970	1971	
Doves (<i>Macropygia</i> spp., <i>Streptopelia</i> spp.)	905	755	1,302	1,260	3,275	7,497
Emerald Dove (<i>Chalcophaps indica</i>)	8	—	208	793	1,204	2,213
Lesser Thick-billed Green Pigeon (<i>Treron curvirostra</i>)	72	262	1,062	890	1,448	3,734
Imperial Pigeons (<i>Ducula</i> spp.), Purple Wood Pigeon (<i>Columba</i> <i>punicea</i>)	28	10	34	37	401	510
Nicobar Pigeon (<i>Caloenas nicobarica</i>)	106	106	738	54	249	1,253
Pigeons (other spp.)	400	2	5	11	60	478
*Parakeets (<i>Psittacula</i> spp.)	1,526	9,982	14,249	33,685	79,341	139,783
Moustache Parakeet (<i>P. alexandri</i>)	11	94	278	218	93	694
Green Hanging Parrot (<i>Loriculus vernalis</i>)	350	700	571	415	3,079	5,115
Koel (<i>Eudynamis</i> <i>scolopacea</i>)	12	—	2	31	—	45
Coucals (<i>Centropus</i> spp.)	15	4	2	12	14	47
Malkohas (<i>Phaenicophaeus</i> spp.)	—	—	1	2	85	88
Owls (<i>Strigidae</i>)	13	43	393	723	1,323	2,495
Fish Owls (<i>Ketupa</i> spp.)	8	4	26	62	45	145
Trogon (<i>Harpactes</i> spp.)	38	132	85	43	253	551
Kingfishers (<i>Alcedinidae</i>)	171	92	150	187	182	782
Bee-eaters (<i>Merops</i> spp.)	—	—	1	2	85	88
Black-billed Roller (<i>Coracias benghalensis</i>)	52	38	130	115	229	564
Hoopoe (<i>Upupa epops</i>)	100	72	198	180	168	718
*Hornbills (<i>Bucerotidae</i>)	88	120	95	111	305	719
Great Hornbill (<i>Buceros bicornis</i>)	78	99	128	126	176	607
*Barbets (<i>Megalaima</i> spp.)	78	37	161	137	384	761
Coppersmith Barbet (<i>M. haemacephala</i>)	49	92	172	308	368	989
Woodpeckers (<i>Picidae</i>)	124	136	724	275	560	1,819
Broadbills (<i>Eurylaimidae</i>)	—	13	56	72	20	161
Pittas (<i>Pitta</i> spp.)	75	71	327	542	741	1,756
*Leafbirds (<i>Chloropsis</i> spp.)	647	1,014	1,161	1,654	3,112	7,588
Blue-winged Leafbird (<i>C. cochinchinensis</i>)	10	20	12	6	63	111
Fairy Bluebird (<i>Irena puella</i>)	367	781	718	2,317	2,185	6,368

SPECIES	Number exported					TOTAL
	1967	1968	1969	1970	1971	
Bulbuls						
(<i>Pycnonotidae</i>)	1,082	1,172	2,070	4,245	4,289	12,858
Drongos (<i>Dicrurus</i> spp.)	7	11	43	123	179	363
Orioles (<i>Oriolus</i> spp.)	39	119	86	215	353	812
Black Racquet-tailed Treepie						
(<i>Crypsirina temia</i>)	8	14	29	237	300	588
Rufous Treepie						
(<i>C. vagabunda</i>)	—	—	16	120	121	257
Hunting Cissa						
(<i>Cissa chinensis</i>)	118	160	389	155	164	986
*Laughing Thrushes						
(<i>Garrulax</i> spp.)	289	996	946	1,019	2,782	6,032
White-crested Laughing Thrush (<i>G. leucolophus</i>)	178	—	634	996	75	1,883
Babblers (other spp.)	—	60	23	75	502	660
Magpie Robin						
(<i>Copsychus saularis</i>)	28	145	190	312	340	1,015
White-rumped Shama						
(<i>C. malabaricus</i>)	331	442	1,033	1,563	4,065	7,434
Tailorbirds						
(<i>Orthotomus</i> spp.)	—	132	—	2	140	274
Flycatchers						
(<i>Muscicapa</i> spp.)	—	—	226	6	9	241
Talking Myna						
(<i>Gracula religiosa</i>)	34,406	43,049	28,111	32,804	61,964	200,334
Starling (<i>Sturnus</i> spp.)	465	1,162	1,387	2,726	3,776	9,510
Glossy Starling						
(<i>Aplonis panayensis</i>)	5	53	156	176	326	717
Sunbirds						
(<i>Nectariniidae</i>)	280	308	217	429	2,162	3,396
Scarlet-backed Flowerpecker (<i>Dicaeum cruentatum</i>)	8,123	2,505	6,666	3,846	13,534	34,674
Flowerpeckers (other spp.)	—	14	100	163	160	437
White-eyes						
(<i>Zosteropidae</i>)	157	283	685	561	2,313	3,999
Weaverbirds						
(<i>Ploceus</i> spp.)	736	23	763	10,486	9,832	21,840
Pin-tailed Parrotfinch (<i>Erythrura prasina</i>)	17,992	38,192	56,931	108,299	195,814	417,228
*Munias (<i>Lonchura</i> spp.)	8,378	9,950	16,115	17,917	56,259	108,619
Chestnut Munia						
(<i>L. malacca</i>)	15,306	19,695	24,761	20,362	16,120	96,244
Tree Sparrow (<i>Passer montanus</i>)	—	340	319	451	571	1,681

*=see species immediately below.

It is clear which species suffer the heaviest predation from human trappers. The case of the Pin-tailed Parrot Finch (Nonpareil) aptly spotlights the overall picture: from a large enough figure of 18,000 in 1967, this all but doubled each year until 1971—when a phenomenal

number of nearly 196,000 or 538 every single day were exported, making a grand total of over 417,000 for the five years at an average of 83,446 every year. This species suffers most it would seem; another hard-pressed bird is, perhaps predictably, the popular so-called Talking Mynah—of which on average over 40,000 are exported each year, with a record number of nearly 62,000 in 1971.

There are no figures available yet for 1972, but I see no reason to believe why this figure should not jump up again. The case of the Mynah is particularly sad as few are ever bred in captivity—over 99% of the 200,334 exported from Thailand over the last five years are sure to be living unproductive solitary lives.

Parrots of the *Psittacula* genus (these include the Alexandrine Parakeet (*P. eupatria*), Blossom-headed Parakeet (*P. cyanocephala rosa*) and the Grey-headed Parakeet (*P. himalayana finschii*)) have also been subjected to increased export trafficking: from little over 1,500 in 1967, the figure has rocketed to one approaching 80,000 for the year 1971 (which is nearly 20,000 more than the sum of the preceding four years).

Munias, even excluding the Chestnut Munia, have been exported over the period at an average of nearly 22,000 p.a., with well over half (56,259) the sum total (108,619) being handled in 1971. The Chestnut Munia almost equals that figure on its own with on average a steady 19½ thousand leaving Thailand each year.

Other figures which struck me as being particularly disturbing were those for the Scarlet-backed Flowerpecker and birds of prey—of which numbers in excess of 13,500 and 3,000 respectively were exported in 1971. The numbers of owls to leave Thailand increased from a mere twenty-one in 1967 to 1,368 in 1971. 15,685 doves and pigeons were exported in the period, together with no mean totals of 782 kingfishers, 1,326 hornbills, 1,819 woodpeckers, 1,750 barbets, 1,756 pittas and no fewer than 6,368 Fairy Bluebirds were similarly sent out.

Apart from the birds I have listed in the table, the report also covers many other species—which appear to be less prone to exploitation and are exported in more reasonable numbers. By and large the current progress of this “boom business” is easily deduced from the 1969–71 figures. Over those three years, an average of 210,248 birds were exported legally from the Don Muang Airport each year.

Figures such as these must concern even the most hardened aviculturist. Clearly we have a lot of work to do if aviculture (the foreign-bird branch) is to remain a respectable occupation. It is my personal opinion that there has got to be changes, and many foreign-bird enthusiasts are going to have to try a lot harder to breed their own stock replacements—for that is surely our responsibility. We cannot continue to be consumers of nature in this wholesale manner. Aviculture, for its own good, must change with the times: already, and many would say not before time, Thailand along with many other tropical countries is tightening the screws on her wildlife drain.

As a matter of interest, over the same five years, 35,500 primates (including over 6,000 Common Tree Shrews (*Tupaia glis*) and 900 Slow Lorises (*Nycticebus coucang*)) were exported legally; so were 1,128 Leopard Cats (*Felis bengalensis*), 1,129 Otters (*Lutra* spp.) and 1,152 bats. Altogether a total of some 52,000 mammals were exported of many different types.

The records for reptiles also showed up some high trafficking: for instance, 61,255 Turtles; 38,644 Snakes; 259 Crocodiles and 40,257 Lizards.

* * *

FURTHER NOTES ON THE BEHAVIOUR OF PAINTED QUAIL

Excalfactoria chinensis

By C. J. O. HARRISON (Berkhamsted, Herts., England)

About a year ago I had the opportunity to keep Painted Quail, *Excalfactoria chinensis*, again and to make further observations on their behaviour at close quarters. These have added a few interesting facts to those already recorded (Harrison 1965, 1968; Harrison, Restall and Trollope 1968).

A pair of quail was given to me for observation by Mr. J. Dowling. The female had developed an odd affliction which caused her constantly to fall over. I lacked accommodation for birds at the time and therefore kept the quail in the room where I was working, converting a shallow cardboard box about 3 ft. \times 2 ft. \times 1 ft. high by covering the open top with gauze panels and inserting a long glass panel into the side of the box. This makeshift cage rested on a bench just below a large window.

The female's trouble appeared to be due to some injury which had impaired her sense of balance so that whenever she turned her head to the left or looked around sharply, she fell backwards. Apart from this she appeared normal. In an attempt to help, and to watch her progress, I made an imitation thicket with thin, upright strips of stiff card projecting an inch or two apart from a solid base. With these to support her when she staggered, the female moved around with reasonable agility. Unfortunately she succeeded in wedging herself in the water-pot during a fall, and in my absence drowned herself. The male commenced the usual calling that occurs in isolation or when the female is not visible; and as soon as possible I provided him with another mate.

THE CROUCHING WALK

Although I had not seen evidence of a furtive way of walking in these or other Painted Quail in indoor situations or when they were on the floor of a shed, the relatively shallow and open-topped box near a large window apparently created an artificial "open space" situation. The birds, when

moving across the box, would use a crouching posture appropriate to such a situation. The birds moved slowly, with the legs flexed so that the body feathers were almost touching the ground. The body was horizontal and the head held low, the top of it in line with the back. The movement was smooth, lacking the more jerky, head-nodding motion of the normal walk. This smooth movement is the one referred to previously (Harrison 1965) which, seen from above, gives the impression that the bird is gliding along on wheels rather than legs. When almost to the further side of the box the bird would abandon this slow movement for a sudden rush to the "cover" of the wall.

A bird suddenly introduced into a box or bare space of this kind may show a similar stance, but half-squatting, with the legs flexed, but the body more upright and the head raised. In this posture it may move around in abrupt, short rushes and, until it relaxes, gives the impression that it has sustained some kind of injury.

ALARM CALL?

In addition to this fear of open space the quail also showed constant nervous awareness of the passage of larger birds, such as rooks and jack-daws, outside the window. The rapid ticking or reeling call which I had previously suspected to be an avian predator alarm was sometimes heard in such circumstances. This call, which was usually followed by a short period of complete silence and motionlessness, also occurred occasionally in response to some external sound, such as the sudden shrieking alarm of a blackbird outside the building, although no cause for fear was visible. However, on one or two occasions a sudden bout of this reeling was followed by the male dashing in circles round the female with plumage fluffed and wings drooping in display, suggesting that the call may have a broader function than is at first apparent.

ROOSTING

In order to give the birds a greater sense of security I added a number of grass tufts at one end of the box. The most immediately noticeable effect was on their roosting behaviour. The pair roost side by side with the hinder ends of their bodies pressed together so that the head ends diverge slightly, or side by side facing in opposite directions, sometimes pressed together so tightly that they appear like one ball of feathers. Hitherto they had normally roosted towards one corner of the box but in the open. When the added turves provided cover in this area they used the cover almost continuously during the day, but at night they moved to the bare half of the box where they still roosted in the open space.

THE THROAT PATTERN AS A SIGNAL

The grass tufts, with earth still on the roots, had been arranged so that they provided a fairly level roof of drooping blades about 5 ins. above the

ground and left small tunnels between the bases of the tufts. The birds quickly utilised these and after thorough exploration both birds, but particularly the female, spent much of the time squatting in small hollows which also gave a wide view of the box. When the birds were using the grass tuft area one aspect of the plumage became more apparent. The throat of the female is unpatterned and pale, but the male has a bold black and white pattern restricted to the throat and lores. When the birds were creeping through the grass tunnels they would raise their heads at intervals, pushing them up through the grass-blades and looking around. In this posture the bill was tilted upwards and what showed most conspicuously above the grass was the throat area which, when the remainder of the bird was concealed, provided as immediate signal indicating both the species and sex of the bird. It may be that the bold pattern restricted to the face and throat is related in this species and perhaps in other gamebirds, to this aspect of visibility in a grassland habitat.

NEST-CALLING

The second female I put with the male was a young one beginning a moult and it was a month or two before she showed any tendency to nest. During the greater part of this period the male performing intermittent bouts of nest-calling (or "cornering" as it is sometimes called in behaviour studies). In performing nest-calling the male would squat in a corner or hollow, facing outwards, with the breast lowered and the tail end sometimes raised in the air. Various scraping and scuffling sounds could be heard but it was not possible to see what foot-movements occurred.

This posture was accompanied by a low-pitched, subdued and mournful note constantly repeated. It sometimes appeared to be a monosyllabic "quoor, quoor, quoor" repeated an indefinite number of times, but on other occasions was a disyllabic "quoror, quoror, quoror". Since the birds were with me in a rather small room every sound was audible, but a week or two elapsed before I realised that a series of sounds which occurred while the male was uttering the mournful note did not, in fact, emanate from the female but were made by the male concurrent with the other call. This second series of notes was a subdued twittering, much higher in pitch than the long-drawn plaintive notes and slightly harsh in tone. It appeared wholly independent on the other call but careful listening revealed that there was at times a similar cadence in the two. There are records of several sounds being uttered simultaneously during song in a number of bird species, but this performance by the Painted Quail would seem to be exceptional even in this context.

The female took little or no notice of the male's behaviour, but once when she walked towards him while he was calling, and several times when she appeared to come on him suddenly by accident, I saw him flatten himself on the ground, half-spreading his wings and turning his head sideways towards the female so that the throat pattern was visible from above

accompanying this by a soft, rapidly-repeated “wit-wit-wit-wit” call. This posture was described before (Harrison 1965) as an apparently more extreme form of tidbitting.

NEST BUILDING

When the grass tufts had been put into the box the male usually called from a hollow among them, although he sometimes chose a useless site such as the narrow crown of a tuft where any egg would immediately have rolled away. Before the grass had been put in he used corners of the box, or the very slight overhang when the loose paper forming the floor of the box lay up against the side and drooped over at its upper edge creating a hollow with slight shelter above.

After a bout of calling the male would often stand on the site stretching upright and looking upwards, or pecking at the side wall, as though he expected to find something there. This first occurred during late winter when long grass was not available and so I took a strip of paper 7–8 inches wide and cut it deeply along one edge to produce a tall fringe of upstanding, grass blade-like strips. When I placed this on edge and partly surrounding one of his sites with it, he called there and then began reaching up and grasping these false grassblades at or near the tip, pulling them down towards him and then releasing them. Very shortly a number were drooping inwards over the site and it is obvious that in a wild state this behaviour would result in growing herbage arching over the nest-site and concealing it from above.

Little other evidence of nest-building was seen until the female laid her first egg when, about an hour before the event, she squatted in a hollow in the grass and began frenziedly sideways-throwing, seizing small pieces of grass or debris and with a quick sideways flick of the head throwing them back to one side of her or the other. She did not lay consistently, and the male started eating the eggs, destroying them within minutes of their being laid. On the few occasions that I was able to make observations eggs were laid between 15.30 and 16.00 hrs.

CARE OF YOUNG BY MALE

The behaviour of this male spoilt any hopes of observing a full nesting cycle, but in recent observation on adults with small chicks, belonging to other aviculturists, I was interested to observe that the attention which the male devotes towards the female and brood includes the brooding of the young chicks, with plumage fluffed in similar fashion to the female's.

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APPARENT SEXUAL DIMORPHISM IN THE CALL OF THE BROWN FISH-OWL

(*Ketupa zeylonensis*)

By C. J. O. HARRISON (Berkhamsted, Herts., England)

At the London Zoo at dusk on 16th June 1973 I was able to observe the calling behaviour of an apparent pair of Brown Fish-Owls, *Ketupa zeylonensis*. The two birds were perched side by side, facing me; and when first observed the presumed male had partly turned towards the other bird. The feathers of its throat were puffed out and formed a large rounded white mass immediately below the bill, the tips of the ruffled feathers projecting a little further than the bill. Normally this white area shows as a thin, inconspicuous whitish band across the throat, streaked with darker colour.

In addition to inflating the throat the bird had also brought the "ear-tufts" into display. In this species these elongated tufts of feathers normally lie flat over the eyes, the tips projecting laterally. They had not been raised like those of other owl species, but appeared to have been ruffled and brought forwards so that they formed prominent shaggy brows projecting above the eyes.

In this posture the bird uttered a very deep and surprisingly soft "hu-hu", the first syllable a little more emphatic than the second. The presumed female immediately responded by inflating her throat, a large white patch appearing where none had been apparent previously, and uttered a trisyllabic call "hu-hu-hu", with the first note also slightly stressed and the other two following at shorter intervals than in the call of the first bird. When the call was complete the throat deflated and the white patch disappeared; but the other bird retained the inflated throat when silent.

The calling was repeated a number of times with the same ceremony. The two calls followed each other in such a consistent succession that to anyone not witnessing the performance it might have sounded like a five-note call from a single bird. The most striking feature was the quietness of the call-notes. From references in literature it would appear that they carry well, but heard at close quarters it seemed improbable that they would carry further than some 50 metres.

The species shows similarities to the typical Eagle Owls. A white throat patch, inflated when calling, is also present in owls of the genus *Bubo*; and Philip Wayre (*pers. comm.*) has noted sexual dimorphism in the call-notes of the Great Eagle Owl, *Bubo bubo*, the male having a monosyllabic call and that of the female being disyllabic.

References in literature to the call of the Brown Fish-Owl vary. Whistler (1941) refers to "a deep triple *hu-who-hu*". Salim Ali and Ripley (1969) seem aware of both calls, describing "a deep hollow-sounding

boom-boom or *boom-o-boom* with a peculiar reverberating ventriloquistic quality"; but only G. M. Henry (1955) seems aware of possible sexual difference, stating that they "... call to each other in doleful and most human-sounding moans; *oomp-ooo-oo* says one, to be answered by its mate with an asserting *oo*".

Owls are not easy birds to observe in the wild and it is probably only under aviary conditions that some problems of their vocabulary will be elucidated.

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 WHISTLER, H. 1941. Popular handbook of Indian birds. Oliver & Boyd : Edinburgh.

* * *

NEWS AND VIEWS

We have received from Professor Cade at Cornell University the report of the captive breeding programme on birds of prey, together with some ancillary literature. Considerable effort has been directed to experiments in artificial insemination, using captive birds with psychological fixation on their owners, and there has been some success. In 1972, using artificial incubation and then allowing adult to rear young, or hand-rearing young, one Golden Eagle, four Lanner Falcons and one Harris's Hawk were raised, the eagle being the result of artificial insemination. This is, however, from sixty-six eggs, twelve of which hatched. The publications are being placed in the Society's library at the Linnean Society.

* * *

Members will have heard with regret of the death of Mrs. N. Howard, well-known for her collection of parrots and her successes in breeding them. Only last year she had bred for the first time in Britain the Hawk-headed Parrot, a breeding for which the Society's medal has been awarded. We understand that Mr. Howard, also a member of the Society, will continue to maintain the parrot collection.

* * *

Following the publication of the account of breeding the Red-fronted Barbet in the magazine earlier this year we hear from Kerry Muller, now at Taronga Zoo, Sydney, that he was successful in breeding this species when curator at the National Zoological Park, Washington, D.C. in 1969.

* * *

According to *The New Scientist*, Professor Jewell of London University put forward at a recent meeting the theory that the key feature of domestic animals (presumably including domestic birds) is that they have lost the ability to respond to adverse conditions that would suppress breeding in the wild progenitors. Selection under domestic conditions will have favoured those individuals which will breed in spite of everything. While this may seem satisfactory to the average aviculturist it could have interesting implications for those who claim that we can maintain and increase wild populations by captive breeding, followed by release of surplus birds.

* * *

Peter Olney writes . . . "the Blue-backed Manakins at the London Zoo which reared a young male in 1972, reported in the magazine earlier this year, have unfortunately not repeated their success this year. One egg was laid in late April on the bare top of the heating pipe grill and, not surprisingly, was later found to be cooked. Then, in the middle of June, two partially-fledged young were picked up dead at the back of the Tropical House. Obviously they had left the nest too early, as did the original first youngster reared in 1972. Regretably it was not known that the female was sitting, for no nest was, or has been, found and she was always on view when we were in the house.

It may be of some interest to record that a hybrid was produced, to an embryo stage, by a female Active (Black-billed Jamaican) Parrot, *Amazona agilis*, and a male White-browed (Spectacled) Parrot, *A. albifrons albifrons*. Unfortunately the egg was abandoned after 14 days."

* * *

With the six adults he now has Len Hill has succeeded in breeding more than fourteen Mountain-witch Doves. This rare Jamaican species is one of the more beautiful of the doves and it is to be hoped that through Mr. Hill's efforts it may now become more widely established in aviaries and zoos.

* * *

Comments have been made in the past concerning unlikely species found with the Society's waterfowl rings on them. The latest is a kestrel, found by someone in north-east London with ring number 714.

* * *

During discussion of the effect of light on bird breeding cycles at a recent conference an attempt was made to relate this to the aviculturists' problem of migratory native species that may come into breeding condition too early if given too much light during winter. Dr. R. Murton's advice was that if the daylight in the bird's wintering area is unknown it is best to play safe and stick to a less than 12 hour day in winter. Since experiments show that a brief period of illumination during the hours of darkness each night can have a similar effect to a long day in stimulating a bird's breeding responses it seems inadvisable even to switch the lights on once the birds have gone to roost.

* * *

Peter Brown writes from the Harewood Bird Garden . . . " Our most interesting breeding to date this year has been that of four Ypecaha Wood Rail which are now half grown and scampering all over their aviary with their parents. This is one of the tallest of the Rails, standing 18 in.-2 ft. and not at all secretive like most Rails. They are eating mostly live food and a little beef.

Ringnecks and imported Redrumps have young as do Peach-faced and Fischer's Lovebirds. Penguins were again a disaster with six hatched but none reared. The oldest lived for two weeks on hand-rearing but then died. We have tried a variety of food substances, but we cannot come up with the complete answer. Invariably the parents let their young die within a week.

The pheasants have been very erratic in fertility with Coppers, Mikados, Eliot's and Bar-tails all being clear but Swinhoes and Brown-Ears are very fertile and we have seven young at present.

We have likewise had good hatches with Bar-head, Snow and Barnacle Geese and Bahama Pintail.

We have three pairs of Snowy Owls sitting and are keeping our fingers well and truly crossed, and Barn Owls have three young.

Last year we sent some Californian Quail from America. These birds have been paired to our own birds and we now have dozens of young quail. Fertility has been excellent.

One interesting pair is a male Roseate Spoonbill which has paired up to a Scarlet Ibis. They have built a nest and the Ibis is now sitting. It would be nice to produce a Scarlet Spoonbill. "

C.J.O.H.

* * *

JAMES BAILEY

Members will be very grateful to learn of the legacy of £100 made to the Society in the will of the late James Bailey, Hon. Life Member, who died in April this year, aged 87.

Jim Bailey, who worked at London Zoo for 44 years, latterly as Overseer of Birds, was a very gifted aviculturist and many Members will have benefitted from his knowledge and long experience. Among his many achievements was the establishment of the Hummingbird House at London Zoo and particularly his invention of the glass feeding tubes, still used today, whereby humming birds were successfully kept alive for the first time in Europe.

Jim's death will have saddened many friends and Council would like to record its appreciation for his contribution to aviculture and his support and interest in the Society.

H. J. HORSWELL.

* * *

CORRESPONDENCE

REQUEST FOR INFORMATION REGARDING NAMES GIVEN TO PET BIRDS

I have been commissioned to write a book on the origins of pet names of all kinds.

I am particularly anxious to have a good selection of bird names, and would be very grateful if members of the Avicultural Society who keep birds as pets would kindly write to me briefly giving the names of their bird or birds and the reason for the choice.

I should naturally also appreciate receiving particulars of the species of bird and short description of its colouring, together with any characteristics which may have led to the name being given

Any information sent will be duly acknowledged.

ADRIAN ROOM.

8, WYLYE COURT,
PARK LANE,
SALISBURY, SP1 3NS.

The Editor does not accept responsibility for opinions expressed in articles, notes, or correspondence.

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NEW MEMBERS

The 10 candidates for Membership in the May-June 1973 number of the AVICULTURAL MAGAZINE were duly elected members of the Society.

CANDIDATES FOR MEMBERSHIP

MISS C. ADAMS, 1, Holland Road, Spalding, Lincolnshire. Proposed by R. Kyme.
DAVID ASHLEY, "Padua", Drews Court, Churchdown, Gloucester.
MR. S. BARTRAM, 4119, Stewart Street, Baldwin Park, Calif, 91706 U.S.A.
MR. BLOOM, 99, Kingsway, Mildenhall, Suffolk.
MR. M. CLARK, Plot A, Gildersleves Estate Office, Middlegate Road, Frampton, Boston, Lincolnshire. Proposed by R. Kyme.
PROFESSOR FR. M. VAN ELMBT, 38, rue Ch. Lamquet, 5100 Jambes, Belgium.
MRS. ERMA J. FISK, 17101 S.W. 284th Street, Homestead, Florida 33030, U.S.A.
MISS M. GERRARD, The Hollies, Gimingham, Norwich, NOR 34Y.
MR. M. KENDALL, "Tadorna", Clewer, Wedmore, Somerset.
L. J. LAZELL, 19, Walnut Tree Close, Bassingbourne, Nr. Royston, Herts.
W. L. M. TER MEULEN, Heuvelbrink 54, Breda, Holland. Proposed by W. H. Wareman.
LAIMONS OSIS, Rt. 2, Box 90, Seal Rock, Oregon 97376, U.S.A.
MR. J. N. PRICE, "Ivanhoe", 11a, Castle Road, Builth Wells, Breconshire, LD2 3EC.
R. H. SALES, 4, King's Down Road, Trowbridge, Wiltshire.
DR. T. J. SELLER, Dept. of Zoology and Applied Entomology, Imperial College of Science & Technology, Prince Consort Road, London SW7 2BB.
JEAN PIERRE SOYER, rue Jean Moulin, Cinq Cantons, 64 600 Anglet France. Proposed by Dr. L. A. Swaenpoel.
MR. E. L. VAN ZYL, 6, Lussell Avenue, Georginia, Roodepoort, Transvaal, S.A. Proposed by Mr. F. Barnicoat.
MR. D. E. WASS, 2, Orchard Gardens, Aldershot, Hants.
MR. A. R. WOOLFORD, 12, Bridge Lane, London, SW11 3AD.

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MR. P. P. F. ALPIN, to 9, St. Peters Road, Croydon, Surrey.
DR. L. F. BAPTISTA, to Moore Laboratory of Zoology, Occidental College, Los Angeles, Calif, 90041 U.S.A.
A. BOOTH, to 29, Croft Road, Hoyland, Nr. Barnsley, Yorks.
W. J. HILL, to 7400, 5th Avenue Northeast, Apt 103, Seattle, Washington 98115 U.S.A.
MRS. HOLLY A. NICHOLS, to 10611, Mt. Boracho, San Antonio, Texas 78213.
J. C. LIEN, to 6501, Palos Verdes Dr. East, San Pedro, 90732.
J. L. MCKEAN to, CSIRO, Div of Wildlife Research, P.O. Box 39998, Darwin, N.T., Australia.
R. M. MARTIN, to 1, Estate Cottages, Cotswold Wildlife Park, Bradwell Grove, Nr. Burford, Oxon.
J. NOUSCH, to 5308, Rheinbach, Neugartenstr. 12, West Germany.
A. A. PRIEST, to 91, Franciscan Way, Berkeley, Calif, 94704 U.S.A.
DR. W. R. SPOFFORD, to "Aguila-Rancho", Portal, Arizona, 85632, U.S.A.

CHANGE OF STYLE

SIR PETER SCOTT, C.B.E., D.S.E., M.A., F.Z.S., L.L.D., M.B.O.U., The New Grounds, Slimbridge, Glos.

CHANGE OF NAME AND ADDRESS

MISS J. FEATHERSTONE, to Mrs. J. Bond, Flat Four, 20, Alexander Terrace, Exmouth, Devon.

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Birds

AVICULTURAL MAGAZINE



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White-collared Manakin (left) Long-tailed Manakin (right)

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SEPTEMBER–OCTOBER 1973

NOTES ON THE WHITE-COLLARED MANAKIN AND LONG-TAILED MANAKIN

(*Manacus candei* and *Chiroxiphia linearis*)

By DR. DAVID SNOW (Tring, Herts., England)

The accompanying plate shows the males of two Central American manakins, the White-collared Manakin (*Manacus candei*) and the Long-tailed Manakin (*Chiroxiphia linearis*). These small fruit- and insect-eating birds, of about the size of tits, belong to a tropical American family and are not to be confused with the seed-eating mannikins of the Old World tropics. They are most remarkable for their courtship displays, which are unsurpassed in complexity and variety.

Males of the White-collared Manakin gather at leks, traditional dancing areas on the forest floor, where each male clears for himself a "court" two or three feet across, from which he removes all fallen leaves and any other debris light enough to be carried away. The basic element of the display consists of rapid leaps, each accompanied by a loud snap of the wings, to and fro between upright perches on either side of the court. Occasionally the bird leaps down to the bare ground of the court and up again, with a curious grunting sound, to a higher position on the same perch. The females visit the males at their courts and mating takes place on one of the upright perches beside the court. The bird in the plate is shown preparing to make a jump from one upright perch to another. The white throat feathers are puffed out forwards so that they project as a beard beyond the tip of the short beak.

The Long-tailed Manakin displays quite differently. Pairs of males take part in a perfectly coordinated dance on a horizontal or slightly sloping perch two or three feet above the forest floor, usually in a place where the undergrowth is thick and observation difficult. In this display the basic element consists of a jump, with fluttering wings, head held low, and long tail feathers drooping, accompanied by a curious vibrant call reminiscent of the twanging of a jew's harp. The two birds jump alternately; as one lands the other jumps up, and the perfectly timed alternate jumps, with the rhythmic twanging, may continue for half a minute or more. When a female visits the display perch the two males face her, and the jumping then takes the form of a Catherine wheel

revolving before her; as one male jumps he moves back in the air, while the other hitches himself forward to take his place, jumping as the first bird lands.

Both of these manakins have traditional sites for their displays, which apparently persist as long as the forest remains undisturbed. Male and female have little to do with one another except at the time of mating. The female alone builds and attends the nest, which is a slight hammock-like structure slung in a horizontal fork of some low plant. The normal clutch is invariably two eggs, whitish in ground colour with fairly thick brownish streaks and mottling. The eggs hatch in about 19 days and the nestlings remain about 14 days in the nest.

* * *

RECENT PARROT BREEDINGS AT THE SAN DIEGO ZOO

By DR. JAMES M. DOLAN, JR., Director of Animal Sciences
(San Diego, California, U.S.A.)

Psittacines represent the largest single family of birds exhibited in the San Diego Zoo. They have long been a speciality of the collection and a number of species and subspecies have reproduced here for the first time in captivity or in the United States. Between 1st January 1972 and 30th March 1973 a substantial number of hatchings have taken place. Certainly the most important is that of a Red Shining Parrakeet, *Prosopeia tabuensis splendens* on 4th March 1973. Unfortunately this bird died on 10th April 1973. Two previous clutches were laid by the hen but these were all infertile. The first clutch consisted of four eggs, the second three and third three. The adult group of birds is comprised of four males and a single female captured in June of 1970 at Kavala Bay, Kandavu, Fiji Islands. Three males and the female occupy an aviary twenty feet long by six feet wide by seven feet high in which are hung two standard grandfather clock nests. All four birds have proven to be very compatible, and there has been no fighting within the group. Oddly enough, these birds have never exhibited any noticeable breeding display. The hen has always spent a great deal of time in the nesting box, as has been our experience with hen *Eclectus*, so it is not possible to give an exact incubation period. The fourth male Red Shining is housed with a pair of Masked Parrakeets, *Prosopeia personata* and as in the case of the Red Shining group, all three birds are compatible. As far as we are aware this is the first successful rearing of a Red Shining Parrakeet in captivity. Two further subspecies of *P. tabuensis* are kept in the collection: *P. t. tabuensis*, which to date have shown no inclination to nest; and *P. t. koroensis*, which have laid two clutches of infertile eggs.

Of almost equal interest is the hatching of a Blue-crowned Lory, *Vini australis* on 29th March 1973. The parent birds arrived on 21st November 1970 from Apia, Western Samoa among a group of five, of which they are the only survivors. This pair of birds produced three previous clutches of infertile eggs. Again we believe this to be a first captive hatching.

Other hatchings among the lories and lorikeets during the 1972–1973 period are as follows: one Red Lory, *Eos b. bornea*; four Forsten's Lorikeets, *Trichoglossus h. forsteni*; two Edward's Lorikeets, *T. h. capistratus*; 13 Red-collared Lorikeets, *T. h. rubritorque*; 20 Ornate Lorikeets, *T. ornatus*; 14 Scaly-breasted Lorikeets, *T. c. chlorolepidotus*; 17 Perfect Lorikeets, *Psitteuteles euteles*; 14 Mt. Apo Lorikeets, *P. johnstonae*; two Iris Lorikeets, *P. i. iris*; three Blue-thighed Lories, *Lorius lory erythrothorax*; nine Yellow-backed Lories, *L. garrula flavopalliata*; and 11 Musk Lorikeets, *Glossopsitta concinna*.

Several interesting hybrids have also been hatched. One Buru Red Lory, *Eos bornea cyanonothus* × Swainson's Lorikeet, *Trichoglossus h. moluccanus*. This particular bird closely resembles Mivart's plate (1896) of the hybrid Gray's Lorikeet, although the parentage is quite different. It has proven to be a hen and is now paired with a cock Red-collared Lorikeet. Since the hybrid bird is a generic cross, it will be interesting to see if it proves fertile. Four Scaly-breasted, *Trichoglossus c. chlorolepidotus* × Meyer's Lorikeets, *Psitteuteles flavoviridis meyeri* have been raised since 22nd November 1971. These birds closely resemble the male parent except they are somewhat smaller, more plump and unlike the father have yellow rather than red under-wing coverts. One of these is now paired with an Iris Lorikeet. A hybrid Black-winged, *Eos cyanogenia* × Red Lory, *Eos b. bornea* was hatched on 2nd February 1973. It is too early to tell what this bird will look like when it is fully feathered, but for the present it has begun to grow black feathering on the head and wings as in the male parent.

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* * *

ON COURTSHIP DISPLAYS AND THE TAXONOMIC POSITION OF THE GREY-HEADED SILVERBILL

(*Odontospiza caniceps*)

By LUIS F. BAPTISTA

(Museum of Vertebrate Zoology and Department of Zoology,
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Until the study of Güttinger (1970), the Grey-headed Silverbill (*Odontospiza* [*Lonchura*] *caniceps*) was one of the least known of the mannikins (*Lonchurae*). Between January 1971 and March 1972 I kept two wild caught pairs of these estrildids, as well as four males and two females which were hatched and raised in my home by Striated Finches (*Lonchura striata*). I made previously unreported observations on the behaviour of these individuals. Some of these observations appear to be of taxonomic importance. In describing displays, the terms "inverted curtsy", "lateral pivoting", and "leap-frogging" used throughout this paper, are after Morris (1957).

Each breeding pair was kept alone in a cage measuring 22 in. \times 18 in. \times 21 in. When not breeding, they were kept in a cage 22 in. \times 36 in. \times 49.5 in. along with some other estrildids. The birds were colour-banded for individual recognition.

COURTSHIP DISPLAY

Güttinger (1970) describes the courtship display of this species as follows: The male grasps a grass stem by one end in the manner of many other estrildids. He flies before the female, then performs inverted curtsies accompanied by song. The inverted curtsy is a bobbing movement in which the main component is an upward thrust imparted by a straightening of the legs. The female then performs inverted curtsies in synchrony with the male, but without song or a grass stem. After a while, the male drops his grass stem, and turning his bill and tail in the direction of the female, sings his long song. The male's display is often accompanied by bowing (the "low twist posture" of Moynihan and Hall, 1954), which in turn often passes to displacement bill wiping. The above ceremony may also be initiated by the female, if she flies before the male and begins inverted curtsies. This display is infrequently, though regularly, performed during pair-formation and before the laying of the first egg. In contrast to most other estrildids, the inverted curtsy display of this mannikin has never been observed to lead to copulation. Frequently the display is followed by allopreening, or both partners feed. Güttinger (1970: 1052) has suggested that this display functions to stimulate and synchronize mated pairs.

The display of my wild-trapped male Left-Yellow (LY) was as follows: With bill mandibulating and pointed at an angle skywards, head and tail turned towards the female, and belly slightly fluffed, LY would sing his long song. If the female changed perches, he would follow her, keeping the same posture and continuing to sing whenever he landed next to her. If she remained still, he would approach her in short hops, while still singing and posturing. Sometimes the female would respond with tail quivering in typical estrildid manner. Irrespective of the female's behaviour, the male would often fly on her back, attempting to copulate. Usually he would leap-frog off. Only on one occasion did copulation ensue.

LY's display was similar to the second part of the display described by Güttinger (1970). The position and movements of the bill were similar to that seen in solitary song (Güttinger, *loc. cit.*), however, the lateral pivoting movements of the head were absent. Only on one occasion did LY perform inverted curtsies during courtship. Although there were always grass stems in the cage which LY utilized in nest-building, these were never used in display.

The display of my second wild trapped male, Left-White (LW), differed markedly from that of LY. His display may be divided into the following two parts: (i) the submissive courtship portion (terminology after Goodwin, 1965) and (ii) the inverted curtsey portion. The first display was usually followed by the second, although each could be performed without the other.

Submissive Courtship. In this display, the male crouched on a perch next to the female. The feathers of the belly were fluffed and covered most of the legs with only part of the toes showing. Its body was bent slightly away from the female. With head and sometimes the tail pointed in her direction, with bill wide open, and tongue protruding and moving back and forth, the male sang to her. Frequently, the male's wing distal to the female was flicked out and in very rapidly several times during singing (Fig. 1). A second male, Right-Black (RB), the offspring of LW, was observed performing this display twice. This display is similar to that described for other estrildids, for example, the species of *Uraeginthus* (Goodwin, 1965). In the Red Avadavat (*Amandava amandava*), a similar display is given, but only to strange females (Kunkel, 1959; Goodwin, 1960).

Inverted Curtsey. After a period of singing in the crouched position, male LW erected himself. With bill still wide open, tongue still protruding and moving back and forth, head and tail pointed towards the female, and belly feathers slightly fluffed, the male performed inverted curtsies. At higher intensity the body was bent away from the female (Fig. 2) and inverted curtsies were alternated with lateral pivoting movements of the body. When performing inverted curtsies, the male slowly approached the female in a series of small hops. Sometimes he

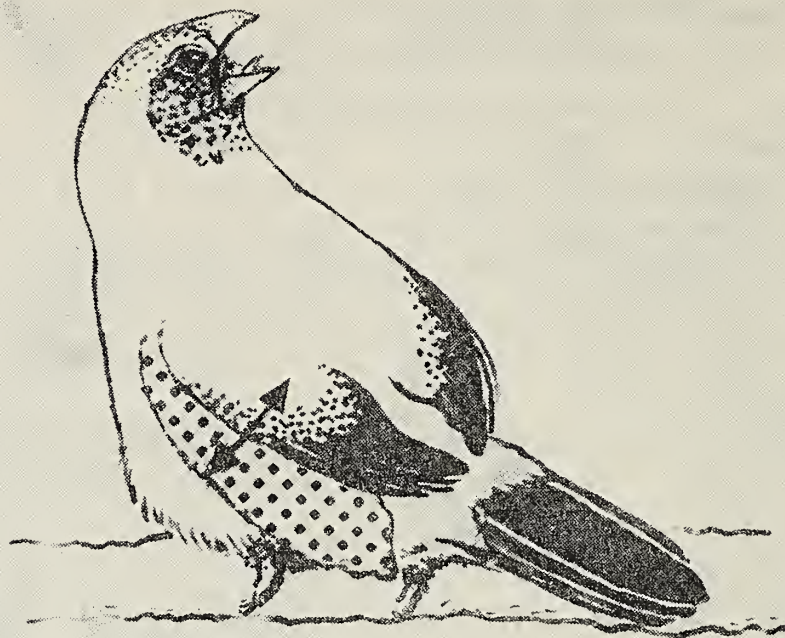


FIG. 1

A Grey-headed Silverbill in submissive courtship display. Note the toes protruding from beneath the belly feathers, the wide open bill, protruding tongue, and the flicking left wing.

danced away from the female. Inverted curtsies were interspersed with bows and or displacement bill wipes. Sometimes the male merely nodded at the female, probably an intention movement to bow (Morris, 1958). On a few occasions, double bows were observed, one bow followed immediately by another. As in submissive courtship display, the wing distal to the female was often flicked out and in very rapidly. On one occasion (19th February 1972) the wing was also quivered as in juvenile begging display (Güttinger, 1970).

The female sometimes responded with inverted curtsey displays. On rare occasions this was followed by tail quivering. Copulation was observed only twice (see below).

LW and LY's displays could be elicited by reintroducing their females to them after a short period of separation. When not breeding, LW would display to any strange conspecific, irrespective of its sex, when the latter was introduced into the cage holding him and his mate. When breeding, LW would ignore or attack strange conspecifics introduced into its breeding cage.

Three other males, offspring of LY, were observed performing stem displays as described by Güttinger (1970). These were never at high intensity, as observations were made when the birds were still juveniles.

COPULATION

At 6.47 p.m. on 9th February 1971 a successful copulation was observed between male LY and his mate Right-Red (RR). I was sitting about 3 ft. from their breeding cage when I heard LY complete two songs. I looked up to see LY on RR's back, his wings fluttering rapidly and tail thrust under hers in the act of coition. After dismounting he flew back and forth between two perches placed $1\frac{1}{2}$ ft. apart. He next flew beside the female, and both birds then engaged in displacement autopreening. At 6.54 p.m. the same day LY performed the same display described earlier. He flew on his mate's back in an attempt to mount her but she did not respond. RR laid her first egg on 15th February 1971.

On 1st January 1972 male LW was observed performing high intensity display to his mate (unbanded). She solicited with tail quivering, her head was slightly upturned and bill wide open. The male leap-frogged over her back four times, but no copulation ensued.

A copulation was observed between the same pair on 12th February 1972. The male displayed at full intensity, and the female solicited copulation with the tail quivering, her head slightly upturned, and bill wide open. After leap-frogging off her back twice, the male finally mounted. He stood perched on her back with tail widely spread for a few seconds, during which time the female's tail was still quivering. He finally copulated with her. After he had dismounted and flown to another perch, the female was seen performing inverted curtsies. At 12 noon on 27th February 1972 LW displayed to his mate at high intensity and the female solicited with tail quivering. The male leap-frogged off her back once, then copulated with her. The female performed displacement bill wiping after coitus, and the male preened his belly.

DISCUSSION

There appears to be individual variation in the displays of Grey-headed Silverbills. Whereas inverted curtsies were always performed by LW, they were rare in LY's displays. Whereas stem displays were performed by Güttinger's birds and three of the four offspring hatched in my bird room, I could never induce LW or LY to use stems in their displays. Moreover, displaying with bill wide open and tongue wagging were observed only in two birds (LW and RB).

Individual variation of this degree is not unusual among the *Lonchurae*. In the Cherry Finch (*Aidemosyne modesta*), for example, males also have a stem display, followed by singing with bill wide open. However, Immelmann (1965) informs us that: "... there is great individual variation in this species. Some males never use a piece of grass, others never sing with bill wide open. . . ."

Copulation has not hitherto been described for the Grey-headed Silverbill. It has been suggested that for the Grey-headed Silverbill and in forms of *Spermestes*, copulation takes place normally inside the nest

(Güttinger 1970, Kunkel 1965). Kunkel (1965 : 175) observed only one copulation for *Spermestes (Lonchura) bicolor*. However, Morris (1957) was of the opinion that with the Bronze Mannikin (*Spermestes [Lonchura] cucullata*) copulation on a branch was the usual method, suggesting that he must have observed this more than once. It may not be too unusual then, for the Grey-headed Silverbill to occasionally copulate on a branch in the usual estrildid manner. Indeed, several aviculturists (summarized in Immelmann *et al.* 1972, in press) have also observed tail quivering by female Grey-headed Silverbills in response to the courtship dance of the male. An alternative interpretation of these observations would be that this is an artifact of captivity (see Immelmann *et al.*, *loc. cit.*), that awaits verification by field study. It is noteworthy that the bill open, head up posture of one of my soliciting female Grey-headed Silverbills was also observed in Bronze Mannikins by Morris (1957). Females of the latter species, however, also protrude their tongue when soliciting. Morris (*loc. cit.*) considered these to be important components of the female's display, derived from the nest building elements of "mandibulating and scooping".

Derivation of Display Components. The submissive courtship display of the Grey-headed Silverbill is very likely derived from the begging display of the juvenile. The posture of the head (Figs. 1 and 2), the waving tongue and wide open bill are all found in the begging juvenile, which does not always twist its head in the more usual estrildid manner (Personal observation). Güttinger (1970) reported that young Grey-headed Silverbills also quiver their wings when begging. Wing quivering is rare in estrildid finches, and has been described in *Aeginthia temporalis*, *Erythrura prasina* (Güttinger 1970, Immelmann 1965) and *Lagonosticta rubricata* (Goodwin, 1964). Friedmann (1960 : 25) reported that nestlings of *Estrilda subflava* "move one or sometimes both wings forward in a jerking, spasmodic gesture". My observations indicate that in begging juveniles of Grey-headed Silverbills the wing distal from the parent bird with food is also often slightly extended. The flicking distal wing in the submissive courtship display of the Grey-headed Silverbill is probably an intention movement to extend and quiver that wing. This opinion was held by Goodwin (1965) who made similar observations on species of *Uraeginthus*. I have reported on one observation of a Grey-headed Silverbill quivering a wing during courtship.

Relationship to Spermestes. LW's completed display was similar in many respects to that of the Bronze Mannikin as described by Morris (1957). The Bronze Mannikin also begins its courtship dance with a crouched display, with the bill open, and the tongue protruding and moving. This is followed by an inverted curtsy display, and lateral pivoting when performed at higher intensity. Morris' birds also danced toward and away from the female, and leap-frogging was described. The similar postures of the soliciting females of the two species have been

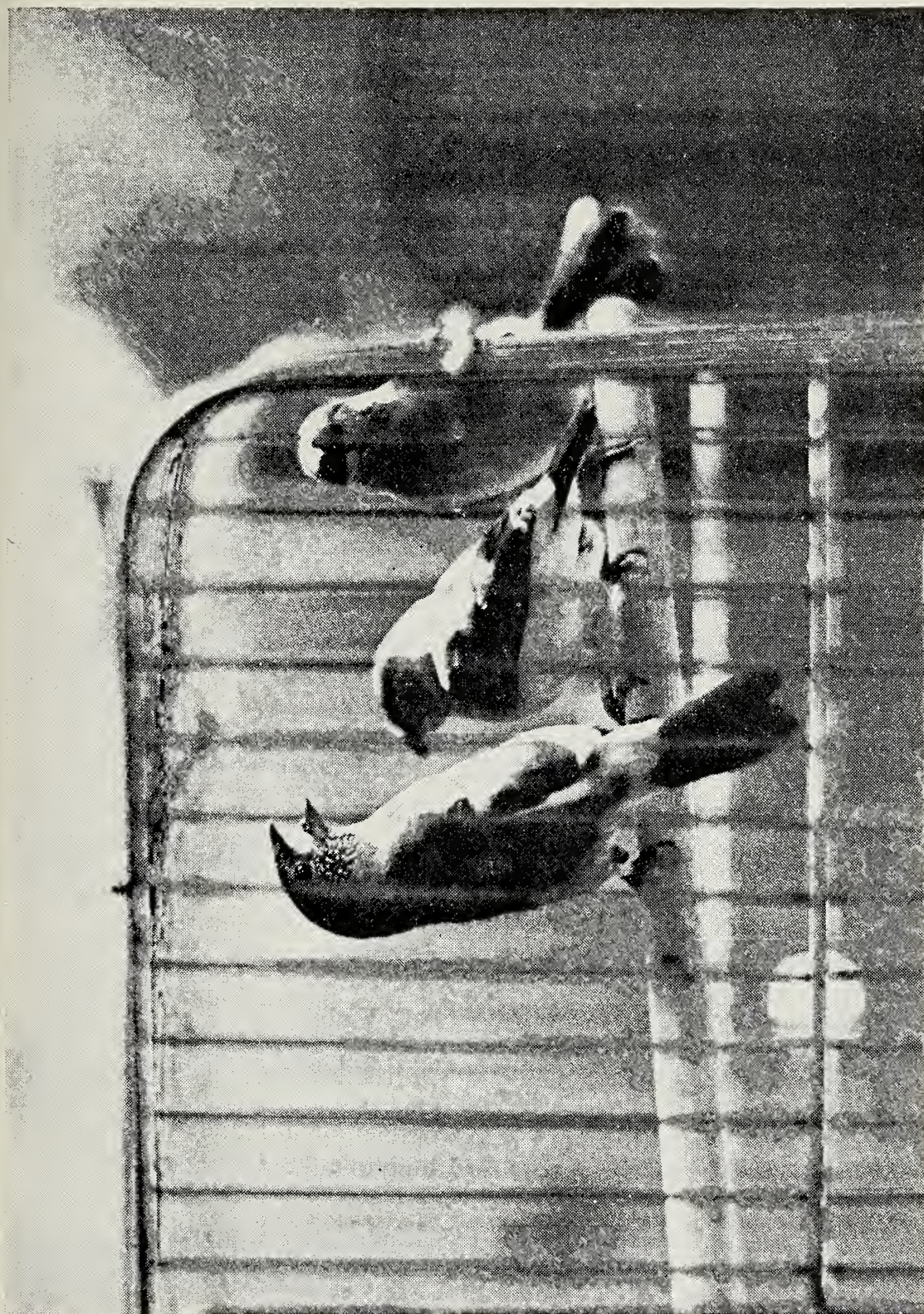


FIG. 2

Photo.: Thomas

High intensity inverted curtsie display. Note the wide open bill and the protruding tongue. This bird is displaying to a stranger (extreme right) introduced into its cage. Note also that its body is bent away from the bird displayed at. The fluffed belly cannot be seen in this picture because the bird has its back turned slightly towards the camera.

discussed. The differences between LW's displays and those of the Bronze Mannikin are that (i) LW's bill was pointed up whereas that of the Bronze Mannikin was pointed down. (ii) Wing flicks were absent from the display of the Bronze Mannikin. (iii) The tongue was moved more rapidly (quivered) in the Bronze Mannikin. (iv) Soliciting female Bronze Mannikins protruded their tongues.

Subsequent to Morris' (1957) study of the Bronze Mannikin, Kunkel (1959, 1965) and Güttinger (1970) have studied and compared courtship displays of all the forms of *Spermestes*. The last two authors both concluded that courtship displays of all forms of *Spermestes* are similar, but with quantitative differences with regard to the frequency of occurrence of the display components.

The Grey-headed Silverbill has been placed by some authors in the genus (or subgenus) *Euodice* along with the two Silverbills *Euodice* (*Lonchura*) *malabarica* and *E. (L.) cantans* (see review in Güttinger, 1970). Güttinger (1970; and personal observations) has shown that in a number of behavioural characters (vocalizations, fighting postures, copulation in the nest, absence of peering behaviour) the Grey-headed Silverbill more closely resembles the African mannikins of the genus (or subgenus) *Spermestes*. My observations on the epigamic displays of LW and RB indicate that the courtship displays of the Grey-headed Silverbill, although variable, fall within the range of variation of that of species of *Spermestes*, lending support to Güttinger's conclusion of their close relationship.

The use of the vernacular "Grey-headed Silverbill" for *Odontospiza* (*Lonchura*) *caniceps* would seem misleading, therefore, because it implies a close relationship to the Silverbills (*Euodice*). I propose the name "Pearl-headed Mannikin" for this distinctive estrildid, a name similar to the German "Perlhalsamadine".

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ALBINO INDIAN RINGNECKED PARAKEETS

By RAE ANDERSON (Sierra Madre, California, U.S.A.)

Twenty years ago with the help of Dave West I got started with lutino Indian ring-necked parakeets (*Psittacula krameri manillensis*). Then again with Dave's help I started with the blue variety. Since then I have been working the hard, slow way from the original birds with split (recessive) factors towards birds that could produce the albino. The anticipation was like that of a child waiting for Christmas with packages beckoning under the tree.

A few years ago I was successful in getting a lutino cock and blue hen to accept each other. This in itself was a project requiring several years. Then finally one baby was hatched, a green male split to both yellow and blue. Then a yellow hen split to blue and two more cocks, and a year later another hen. This year they hatched a single cock which died within a few days after hatching. I swapped two of these young "split-both-way" cock birds with Dave West and John Furniss to reduce inbreeding.

This season a two-year-old pair started work particularly early with a clutch of three eggs in early January, 1972. On 12th February, these eggs appeared to be clear and were removed. The nest was then checked on 24th March, some two or three weeks after the hen seemed to be incubating again. At this time there were four eggs. On 1st April the nest was again inspected and to my exaltation and amazement, there were three pink-eyed babies. These appeared to be about five days old. This breeding combination can produce green, yellow, blue and albino but the probability of an albino is I believe about 1 in 8. The three pink-eyed babies immediately ruled out all greens and blues in this clutch and brought the albino possibility down to about 1 in 3. With three pink-eyed babies this means an almost certainty of having one albino.

Of course, my anticipation was almost without bounds but I did not want to take the nest box down and open it unless the hen was out. For the past two weeks if she was not already in the box she had made a dive for it whenever she saw any of us approaching her aviary. I felt that by this weekend, 22nd April, the babies would be old enough so that their

pin feathers would be opening and would be too large to be injured by the hen's scrambling if I opened the box with her inside.

Upon opening the box in the somewhat subdued light of the aviary shelter with one of my sons, and while we were looking for the possible white baby, my immediate reaction was one of disappointment at seeing only two babies. This disappointment was very short lived, however, as my son recognized before I did that one of the babies was indeed an albino and that it was the larger of the two. The third baby appeared to have been dead about a week. It was decomposed beyond recognition except that a few tiny yellow feathers were apparent. The fourth baby was never found.

I feel very fortunate that the bad odour of the dead baby had not caused the mother to abandon the clutch. We had, however, been checking at least every morning and evening to be sure that she was in the nest. I removed the albino from the nest for hand raising because of Harold Rudkin's experience of the hen killing her white baby. This was probably due to its "odd" colour. I could not risk this because my breeding combination was identical to Rud's.

It is my understanding that the albino raised by the Keston Foreign Bird Farm in 1963 (the first recorded albino Indian Ringneck) was a female. From the colour genetics of its parents (Cummings, 1964) the only albino possibility from this breeding is a hen. This bird unfortunately died before reaching maturity.

Harold Rudkin then hatched the one that, shortly after its pin feathers opened, was killed by its parents. Post-mortem examination proved this baby to be a cock. Its skin is now in the collection of the Los Angeles County Natural History Museum. Then in 1968, Mr. Rudkin was again successful in producing an albino. This time, however, from parents with a different colour genetic combination which could only produce albino hens. This breeding is related in the *American Aviculture Bulletin*, October, 1970. In 1969 Dr. Swaenepoel in Belgium successfully raised one. As stated (Swaenepoel, 1970) this bird had to be a hen. I understand that it is now in the collection of Alfredo Marques. My baby, however, has a 50-50 chance of being a cock based on the colour genetics of its parents. This is from the same breeding combination as Mr. Rudkin's first which was a cock.

At this time the bird is a full grown perfectly proportioned specimen, having been independent since June, 1972. I am not able to do more than guess at its sex because I have neither observed it to display nor other known males to display to it. I am, of course, hoping for a cock.

I am still uncertain as to whether or not the pink neck ring will appear if it is a cock. While I hope that the pink ring will be there, I do not believe that this will be the case. The pink ring might well occur with natural accidental albinism, but I do not think we will see it with "albinos" developed from yellow-blue breedings. In our aviary

developed " albinos " the bird is actually a pink eyed blue (dilute—having lost the melanin) bird. Since it is basically a blue bird with pink eyes and since blue cocks have white neck rings, I suspect that our " albino " factor will produce white birds with white neck rings. I am most anxious for this to be proven one way or the other.

This year, 1973, another albino Indian Ringneck has been produced in California. This was in the aviaries of another aviculturist. This bird is now independent and an excellent specimen. It is from the same genetic combination of parents as is mine. This now brings to three the number of living albinos in Southern California. We believe that this is the total number existing in the United States.

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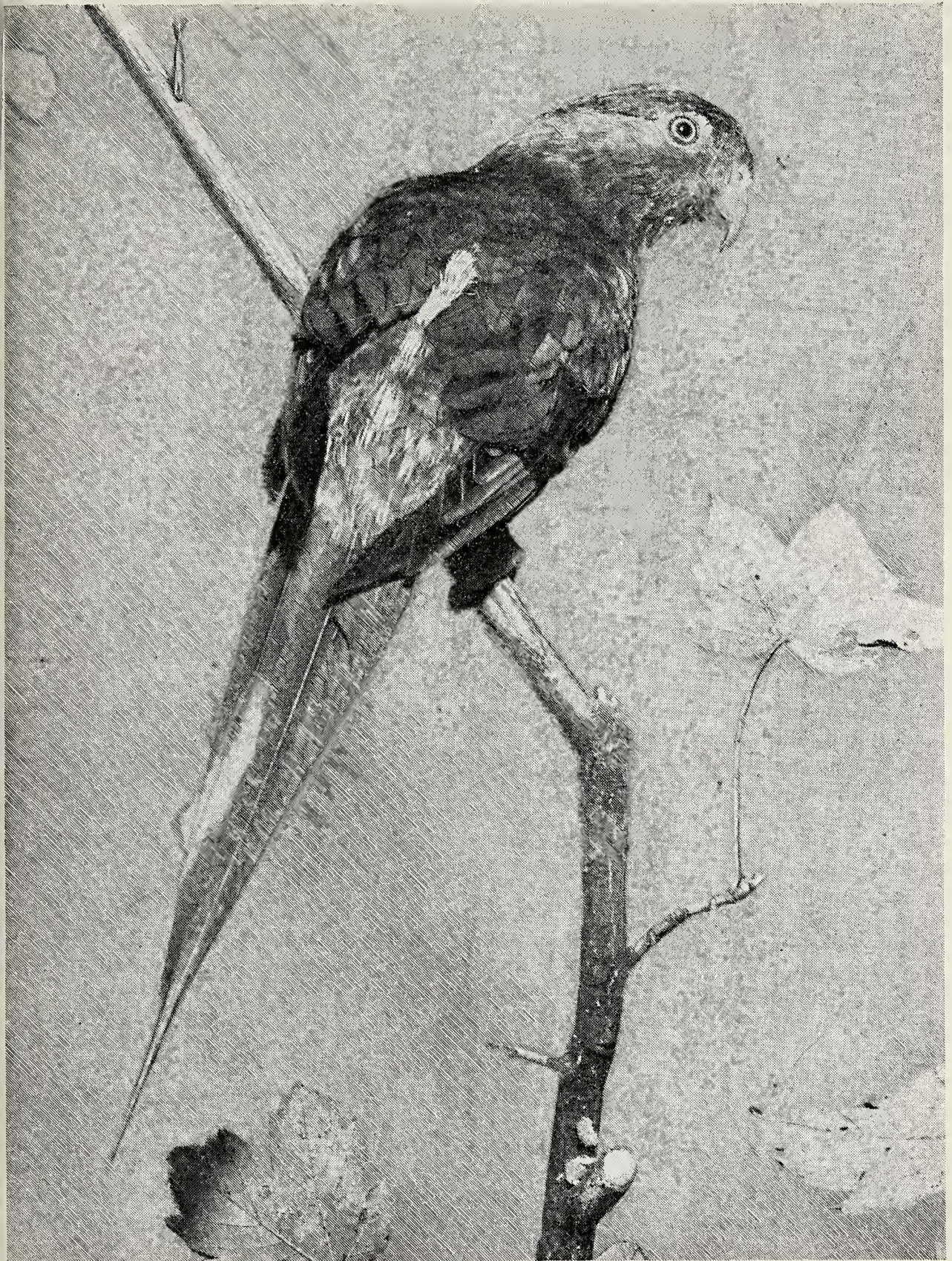
THE PAPUAN LORIKEET

By ROSEMARY LOW (New Barnet, Herts., England)

The Papuan Lorikeet (*Charmosyna papou papou*) is virtually unknown in aviculture and almost nothing seems to have been recorded about it. There is, however, a plate of this species in Mivart's *Monograph of the Loridae*. I never anticipated seeing any of the members of this genus alive, let alone having the opportunity to keep one—but in aviculture unexpected events are always happening, particularly regarding the availability of species.

When a friend telephoned me in September 1972 to tell me that she was about to import a Stella's Lorikeet (*C. p. stellae*) I was at first incredulous and, a few days later, on seeing the bird, completely captivated. The *Charmosyna* Lorikeets are among the most beautiful birds in the world and this individual was hand-reared and completely fearless, thus adding to its attraction. When I was asked if I would like to look after it for a time, my reply was naturally in the affirmative!

On closely examining the Lorikeet, I realized that it was not Stella's; its description agreed with that for the Papuan given by Salvadori in his *Catalogue of Birds in the British Museum*—except for one point. Salvadori gave the length as " from 16.9 to 14.93 inches, tail from 10.6 to 8.23 "—yet this bird measured only 11 inches or 12 inches. The mystery was solved when the Papuan moulted its tail (which as the photograph shows, was rather frayed); this was replaced by an 8 inch tail to give a total length of approximately 14 inches. The tail is reminiscent of that of a Fischer's Whydah (*Vidua fischeri*) in that it tapers almost to a hair's width. When the tail feathers are spread the beauty of each feather can be seen. There



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[R. H. Grantham

Papuan Lorikeet (before tail was fully grown)



is a red patch on one side of the web, also a yellow patch which extends to the side of the web which is mainly green.

This species is extremely slim in build and cannot be compared in this respect with any of the more familiar species of Lorikeet. The shape of the head and beak are, to me, reminiscent of certain Hanging Parrots (*Loriculus*).

The colouring of the Papuan Lorikeet is particularly attractive. The wings and the upper side of the tail are dark green, the underside of the tail and the tip of the upper side being yellow. The head and underparts are scarlet with a darker sheen on the upper breast. There is an almost square patch of colour on the crown, which is dark blue at the front, becoming black. Further back, on the nape, there is a crescent-shaped black patch. There is also a black patch on the abdomen which meets the black of the front of the thighs, the thighs being yellow at the back. The lower rump is decorated with a patch of dark blue.

The feet are pinkish and the nails black; beak orange; iris orange with a very narrow ring of paler orange which is noticeable only on close inspection.

The *Charmosyna* Lorikeets are sexually dimorphic, thus I know that the bird in my temporary possession was a male. Salvadori described the female as follows: "The red feathers on the sides of the rump have the base yellow; a yellow-orange patch over the yellow spot above the thighs."

He stated that in immature birds the nape, abdomen and thighs (which are black in adult birds) are dark green.

Being hand-reared, the Papuan loves attention and would display as soon as I spoke to it. In display, the yellow patches on the thighs stand away from the body. A soft whistling noise is made and one foot is lifted and waved, more rarely both feet in turn.

The flight is unlike that of the more familiar Lorikeets, no doubt partly due to the fact that the long tail holds the bird back to a certain degree. Another characteristic is the way in which a perfectly straight line of flight was never taken, the bird always flying upwards just before landing.

The Papuan refused fruit and small seeds. Its diet consisted of nectar made from equal amounts of honey and malt, with the occasional addition of condensed milk, with the same mixture added to trifle sponge. The Papuan was particularly fond of the latter. Every day several drops of the orange-flavoured multi-vitamin preparation Vitavel were added to the sponge cake and nectar. On this somewhat monotonous diet the Papuan thrived—in fact I have seldom seen a fitter and more active bird. It bathed every day and kept itself in immaculate condition.

After nine months in my care, the Papuan was sold to a fellow member of the Avicultural Society. I am pleased to record that it now resides in a 20 ft. planted aviary, in a collection of small softbills, where it is greatly admired by all who see it.

BREEDING BEHAVIOUR OF CAPTIVE STRIPED OWLS

(*Rhinoptynx clamator*)

By ANN E. GOODMAN and ERMA J. FISK (Florida, U.S.A.)

Two Striped Owls, (*Rhinoptynx clamator*), obtained separately as non-flying juveniles in Iquitos, Peru, have been observed since 17th August 1963 (male) and 14th September 1964 (female) by A. E. Goodman in an outdoor aviary in South Miami, Florida, U.S. This pair has raised five young since April 1969. As nothing seems known of the breeding habits of this owl except that it is a ground nester (Haverschmidt, F., *Birds of Surinam* 1968) we present here a description of the nesting behaviour of this captive pair.

Cage and Feeding

The birds live in an outdoor aviary 6 ft. \times 10 ft. \times 10 ft. with a natural ground floor, natural perches, and tropical planting. Each bird daily consumes two or three day-old chickens from a supply kept continually available, with an occasional dead rat or mouse as offered. The male has been seen to catch and eat a Cuban tree frog (*Hyla septentrionalis*). Cardinals, Mockingbirds and warblers enter the aviary without molestation. Neither owl has been observed to drink.

Nesting and Incubation

Breeding behaviour was first initiated by the male in February 1966. His soft night hooting became louder, with an aggressive tone. He made rudimentary nest scrapes, proffered food to the female, which she refused, and attempted copulation. This behaviour continued intermittently until the first egg was laid on 6th April 1969. Since then 10 clutches have been incubated, three with four eggs each, seven with three.

The male makes several shallow scrapes at each nesting. Originally these were primitive, but they have developed until the last was a depression about seven inches in diameter, deepened by the female during brooding to three quarters of an inch. The only nesting material is litter such as bits of leaves which the female may pull in while sitting, and stuff under her breast.

Eggs are unspotted pinkish-buff. The only one measured was 4.7 mm. \times 5.5 mm. Apparently they are laid before mid-morning at approximately 60 hour intervals. Incubation is by the female only and starts with the first egg. The period to hatching is approximately 33 days. The time differential in four clutches where two chicks were hatched was judged to be from one to five days. During her first incubation the female often left the nest for periods of time, even in rain. Thereafter during

the first two weeks of each brooding she left very briefly, only once or twice a day, to defecate. She is fed on demand, by the male. Eggs are turned with the bill. The nests have been moved several times from one to five feet, either with eggs, or chicks in them. In one instance the chick was three weeks old. The method was not observed, nor the method by which the nest is always kept clean. The female has been observed eating the hatchling's shell. A downpour flooded the nest 11 days before one successful hatching until for 15 minutes only the incubating bird's head was above water. Weather of this sort would be typical in the range of this tropical species.

Clutch
Only one chick is raised. A second chick may hatch, appear healthy, but disappear within a week. The other eggs of the clutch are kicked out during incubation and shortly disappear. In three clutches where one chick hatched one survived, two disappeared within five days each.

Table of clutch dates, number of eggs, and success

<i>Clutch</i>	<i>First egg</i>	<i>Eggs</i>	<i>Chicks</i>	<i>Pipping</i>	<i>Chick seen</i>	<i>Survival</i>
1	4/6/69	4	2	5/9	5/12* 5/15	1
2	12/15/69	4	2	—	1/18/70* 1/21/70	1
3	3/5/70	3	1	—	4/7/70*	0
4	8/10/70	4	1	—	9/15/70	0
—	10/9/70	1	—	Broken	10/10	0
5	11/20/70 11/30/70 12/4/70	1 1 3	neglected neglected 2	—	1/4/71 1/9/71	1
6	5/29/70	3	0		—	0
7	11/23 or 11/24 }	3	2	12/26 —	12/26 12/27	1
8	3/12/72	3	—	deserted a week before term		0
9	5/22/72	3	—	sat full term, then on and off a week, then kicked out eggs		0
10	10/18/72	3	1	11/18/72*		1

* Could have hatched earlier.

In the above table the sequence of figures follows the usual custom in the U.S.A., i.e. month, day, year.

Brooding

A chick is closely brooded in the nest for about two weeks. To accommodate its rapid growth the female deepens the nest and broods with arched wings. She maintains this posture, wings arched, head bent over the young, while feeding for some time after the chick has emerged from the nest. Small pieces of food are gathered into a mouthful and proffered with a special cluck, the chick taking the food from her bill. If alarmed she signals the chick to return under her wing by rapping it on the crown. The chick signals its desire for shelter by pecking at the joint of her wing and shoulder until the wing is raised. When a chick has grown too large to brood she backs up against it and raises her wings over it. It is sheltered from rain by this means until it is almost full grown.

When first out of the nest the small chick sleeps flat out on the ground, neck extended, feet tucked under. The female shelters it from sun by a raised wing, or her shadow cast from a perch above it. Even when full-grown a chick will lean against the female when resting; and the female was seen to leave a new clutch of eggs untended several times to feed a 50 day old chick that was refusing to accept food from the male. Both parents watch the chick closely at all times. The female stays physically closer, the male is more nervous at human approach to the aviary, and more agitated by the mishaps of flight, or failures in self-feeding of his young.

Bill as a tool

There is some evidence of the bill being used as a tool. Small chicks, unsteady, may fall into the bloody carcasses of the chickens from which their food is coming. The female has been observed to gather pieces of dried leaves in her bill and to use them to wipe the blood from both faces and breasts of the young. With many avian species a chick that falls from the nest, or gets into physical difficulty will be ignored and left to die. One of these young owls attempting flight after clambering up the aviary wire to a high perch, crash-landed in the base of a palm tree and became helplessly wedged among the stiff stalks. Both parents were much agitated. The female flew down and pulled aside one of the stiff stalks until the chick was freed.

Communication

Except when the female is on the nest mating is frequent. The voices of all these owls have been distinctive, and they are strongly communicative. There is much soft, low, conversational hooting by day as well as by night. On the nest the female clucks when she wishes food brought to her and she has been observed to cluck persistently until the male removed unwanted food. If he delays in attending her she becomes agitated and screams. It is the female who shrieks alarm at nocturnal possums or other animals coming about the aviary at night.



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Female Striped Owl on nest, baby with eyes still unopened, apx. 1 week old

[Bob Harmer

The first warning sound given by the male when disturbed is similar to the heavy breathing of a human. With continuing disturbance he will click his bill rapidly, hiss and spread his wings. In full attack he is soundless, but hits the aviary wire with great force.

By the 18th day all three birds eat at the nest. The female does not permit the male to feed his young until after she has done so. Later, when she is teaching an older chick to pick its own food, if the male attempts to aid the unskilled young she interposes herself, often screaming, until he retreats. On the other side of the coin, when the eggs of a clutch (that failed) were left unattended, the male was much agitated; and another time, when the female left a nest after heavy rain to spread her wings in the sun, the male screamed at her until, still wet, she returned. Again, a few-day-old chick was seen abandoned out of the nest, extended on the earth, ignored by the female. The male flew hooting about the aviary until finally she scooped the chick up with her bill and tucked it under her. Then he quieted. (The chick disappeared that night.) Chick A, a female, was removed to a second aviary, where she lives with a Spectacled Owl (*Pulsatrix perspicillata*). They copulate and she sits on infertile eggs. But during the mating season she calls constantly to the male of her own species a few feet away. Another chick, removed from its parents at 60 days (as the female was sitting on a new clutch) was also put in with the Spectacled Owl, who preened, and fed it. Both chick and parents cried back and forth to each other for many days.

The following timetables are roughly applicable to the development of all five young, as the growth patterns have been similar.

Behaviour development

Hatching: male at this time only viciously attacks at any approach to aviary.

5 *days*: chick seen leaning unsteadily against female, who interposes herself between it and any observer.

11 *days*: chick attempts to pick at food.

21 *days*: chick sleeps in open close to female; preening effort.

22 *days*: chick out from under female for good, except in heavy rain.

27 *days*: chick bobs and weaves head like adult, clicks bill, hisses and spreads wings at humans.

29 *days*: chick wanders from nest, picking at leaves and sticks.

36 *days*: chick perches close to the ground, on sticks or small rocks.

37 *days*: chick climbs wire of aviary, using talons, bill and wings.

Unsuccessful attempt at flight.

39 *days*: pellet seen cast.

40–45 *days*: chick preens, perches on one foot, like adult. Climbs up wire to high perch, is unable to descend. Stays in this one place for several days, moving away from position to defecate.

- 46 *days*: chick flies short distances, horizontally. Not always with success. Given a first, thorough preening by female.
- 50 *days*: female and chick play together often, nibbling bills, preening and picking at each other, chick grabbing adult feathers in its talons. Chick gives a new, clucking call.
- 57 *days*: chick flies freely and feeds alone, although with difficulty.
- 62 *days*: parents refuse to feed. The chick will cry, day and night for several days, a thin high cry like the squeak of a hinge. Chick A went without food until . . .
- 66 *days*: chick picks 2-day-old chicken off ground and eats it. Usually in feeding small pieces are given, but occasionally a thigh and leg have been seen to be swallowed whole. A single instance was observed, at 58 days, of a chicken swallowed whole. An adult has never been seen to do this.
- 132 *days*: both adults attack chick in a bloody battle. Chick removed to another aviary.

Plumage development

Natal down buffy, extending to talons.

10 *days*: eyes opening, facial disk developing

18 *days*: superciliaries faintly pencilled in. Egg tooth still present.

21 *days*: white facial tufts and white of chin showing. Eyes widely circled with a dark brown that remains through juvenal plumage.

40–50 *days*: primaries, secondaries and short barred tail clear of down, but body and all coverts still downy gold. Ears begin to show.

51 *days*: horizontal stripes discernible through the still heavy mat of golden down on breast and belly. Long down of flanks obscures the legs. Down largely worn off the mantle, but still present on the erected ear tufts, head, and wing coverts. The juvenal plumage is lighter in colour than the adult, with more buff on the wing feathers. Rectrices are tipped buff. Eyes reddish-brown as against the adult dark brown.



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[J. V. Beer

Chilean Flamingo feathers which have been damaged by the black hyphal masses of the mould *Cladosporium herbarum*.

FUNGAL INFECTIONS OF THE PLUMAGE IN FLAMINGOS

By J. V. BEER (The Game Conservancy, Fordingbridge, Hants.)
and

JANET KEAR (The Wildfowl Trust, Slimbridge, Gloucester, England)

Cladosporium herbarum, a common fungus present on plants, organic debris and in the air, is also known as a pathogen on the plumage of captive flamingos (Beer 1969). It forms black sclerotia within the feathers, rupturing the cortex and weakening the structure so that the distal portions of the feather barbs break off (see the plate). The plumage of the back becomes dingy and frayed, and the birds are wet and miserable-looking. At Slimbridge, the condition has sometimes seriously affected the Chilean form *Phoenicopterus chilensis* in the late autumn and, to a lesser extent, the Andean *Phoenicoparrus andinus* and James' *P. jamesi* species.

The mould is slow growing at an optimum temperature of 24–25°C. At 27°C, the growth rate is halved and at 30°C, spore germination is completely prevented. Below 24°C and down to 0°C, development is sluggish, although sub-zero temperatures are necessary to prevent growth altogether. At 0°C, a colony on an agar culture will be 2–3 mm. across in 2–3 months. Because of this temperature relationship, only the flamingos' outer feathers, away from the bird's body heat, are affected (the scapulars are especially prone) but, conversely, cold winter weather will not entirely inhibit growth. The spores also survive dehydration and, because they are heavily pigmented, do not succumb to light. Thus treatment is difficult.

Badly affected feathers can be pulled out or cut off. Dusting with a fungicidal powder only affects the hyphae deep in the feather with difficulty. Raising the ambient temperature to 30°C should stop growth, but only while heat is applied; in any case, this temperature level will not kill the mould. At Slimbridge, we have tended merely to wait for the birds to moult.

In the autumn of 1972, the Chilean Flamingos were seen to be particularly badly affected. There had been severe attacks by aphids (greenfly) on three of the willow trees in their pen that summer. The leaf surfaces had become coated with the sugary honey-dew secreted by the insects and later covered with a black mould which had apparently caused the leaves to fall. By December, the tree trunks were still thickly powdered with a sooty mould and from this *C. herbarum* was cultured in the laboratory.

Of all the willow species in the Wildfowl Trust grounds, only the Osiers *Salix viminalis* are badly affected by greenfly. These trees have been eliminated. The source of infection in the Andean and James,

Flamingo pen appeared to be a balsam poplar *Populus gileadensis*, the trunk of which has now been painted with malathion.

It is too early to say whether this treatment will prevent mould outbreaks on the flamingos' plumage in the future. Clearly, in summers when aphids are especially common, the vegetation in the vicinity of colonies needs periodic examination. *Cladosporium* spores cannot be completely removed from the environment, since they are the commonest fungal component of the airspora, but gross local contaminations can probably be checked.

Apparently *C. herbarum* does not act as a pathogen in other birds, and the captive waterfowl sharing the habitat of the flamingos at Slimbridge are unaffected. The mould is opportunistic and can grow on a weakly nutritive substrate. If the bird washes itself in water contaminated with food and faeces, then the materials adhering to the feather surface provide a substrate on which initial mould growth is possible. This does not explain why the particular fungus invades the structure of flamingo feathers. *C. herbarum* is clearly able to pass through the keratin walls; the action may be mechanical or enzymic. *In vitro*, isolates from infected feathers appear to cause no change in the structure of mammalian hair, although growth is vigorous (Clayton and De Vries, pers. com.). Damaged feathers would be more easily invaded, but only a minute hole is needed. Perhaps keratinisation is less complete in flamingos thus facilitating penetration, and at the same time providing a richer substrate on which the fungus grows and produces the hyphal masses which damage the barbs. Perhaps the preen gland oil is fungistatic in resistant avian species. Further investigation is required.

ACKNOWLEDGMENT

Dr. Collis of the Commonwealth Mycological Institute kindly confirmed the identification of the original isolates and Mr. N. A. Wood cultured and identified the fungal specimens taken from the willows.

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BREEDING THE MASKED TANAGER

(Tangara nigrocincta)

By C. MILLER, JR. (Baltimore, Maryland, U.S.A.)

In the spring of 1973 I succeeded for the first time in breeding my pair of Masked or Mrs. Wilson's Tanagers. The breeding took place in a flight 8 ft. \times 6 ft. \times 7 ft. high, located in the third floor unfinished attic of my home in Baltimore. In the flight along with the tanagers were some 18 other birds, all seed-eaters. The tanagers attempted to breed several times before succeeding. Following are the details and background of their breeding history.

I obtained them in November, 1971 from Canary Bird Farm in New Jersey. Walt Frey accurately picked out a pair from a South American shipment for me. I housed them in the above-mentioned flight; the other birds with them were: 1 pr. Java Sparrows, 2 pr. African (Red-billed) Firefinches, 3 pr. Yellow-bellied or Sweet Waxbills, 1 pr. Orange-cheeked Waxbills, 1 Red-eared Waxbill, 1 pr. Starfinches, 2 pr. Cut-throats, 1 Jacarini cock, 1 Red-billed Weaver, 1 pr. Button Quail. The Cut-throats and the Weaver were removed before breeding occurred.

In October, 1972 the Tanagers nested, laid one egg, but did not incubate it. They nested a second time 17th December 1972, laying two eggs in a wicker finch nest using only a little hair and string as lining. The eggs hatched in 14 days. The weather at this time was bitterly cold, and, since my attic is uninsulated, temperature there was chilly. On 8th January the temperature at 7 a.m. was 45°F. It rose to 51 as a high that day. I noticed then that all the birds in the flight increased their consumption of live food (meal worms and fruit flies) considerably. On 9th January it was again 45°F at 7 a.m. On 10th January I fed live food at eight in the evening. I noticed then that the tanagers did not feed this to the young immediately as they had been doing. On checking I found both babies stone cold and dead.

On 20th January I was distressed to see that the hen looked a little puffy. I kept an eye on her, and noticed that two days later she was missing. A check revealed a tail sticking out of the wicker nest, which incidentally they had defended as theirs all along. With a mirror I looked into the nest and found two light blue, speckled eggs. One of these hatched on 4th February the other failed to hatch. The young was found dead on the floor of the flight on the evening of 7th February. Thus ended round 2. I should add that this time around I fed plenty of live food in the form of mealworms, corn grubs, and small crickets.

The next round began with a first egg on 18th February 1973. Needless to say, my enthusiasm had died down a bit by now. A second egg was laid on the 19th, and both of these hatched on time on 4th and 5th March. Although the parents were feeding, I removed the young on 6th March

and gave them to Fred Beall, principal keeper at the Baltimore Zoo, for hand feeding. Both lived until 10th March. They had been fed soaked dog chow along with flakes of apple and orange.

The next round commenced with the hatching of one out of two eggs on 4th April. Although I fully expected this young one to be thrown out of the nest also, the parents continued to feed it. On 14th April I noticed that its eyes were open, and on 18th April it fledged. On 22nd April I banded the fledgling with the number AS-73-H289.

On 23rd April the hen laid another egg (she had looked puffy on the 21st; apparently this is a sign that she is manufacturing an egg). A second egg appeared on the 24th. On 4th May the fledgling tanager, at four weeks of age, was still being fed by its father. On 7th May I saw it feed itself for the first time, though later in the evening (and subsequently as late as 12th May) I saw the cock bird feeding it also.

On 8th May the firstborn of nest no. six hatched, the other egg again failing to hatch. On 13th May at 8.30 a.m. I found this chick dead on the cage floor. I think it was thrown out, or at least died, because of insufficient live food this time around.

On 20th May the six-week-old fledgling tanager began chasing the tiny waxbills for sport, so I caught him up and removed him from the aviary. On fledging, the bird's colour was overall a charcoal grey suffused with blue. The belly was paler grey. The beak was black with gape marks of ivory. At the time of writing it has developed its blue shoulder patches and is fast developing its white abdomen and coppery nape. On fledging, its tail was very short, but it could fly well enough to keep off the floor.

The food available to its parents during the time it was in the nest is as follows: apple, orange, banana (occasionally), peanut butter, Prunty insectile (mockingbird) mix, Purina dog chow soaked 30 min. in cold water, finch mix, Scarlett's "wild seed" mixture, Stimulite nectar formula, and live food, including a fruit fly culture.

Some observations on the breeding behaviour of these birds: First, the female does all the incubation. Second, for the initial 14 days, the parents feed only live food to the young. Third, like most monogamous birds, the male assumes most of the responsibility for feeding the young after fledging, while the female goes back to nest. It is interesting to note that these birds are supposed to build an open cup nest in nature, but chose a covered wicker finch nest in my aviary. Finally, I might add that the *Calliste* tanagers are not quite the "hothouse flowers" that most writers state they are. Mine took a low temperature of 34 degrees this winter, with no ill effects. Success with the Masked has spurred me to try breeding other species of the group; I have a true pair of Speckled Tanagers (*T. chrysophrys*) which were observed mating by me and by Mr. A. G. Scott of Toledo, in March. Perhaps they will be next!

As verification of the authenticity of the Masked's breeding, I had Shon Ross of Baltimore observe the parents feeding the young before

fledging. Fred Beall also witnessed this. Hal Bruce witnessed the fledgling being fed by its father two weeks after leaving nest and still in juvenal plumage.

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BREEDING THE ORTOLAN BUNTING

(*Emberiza hortulana*)

By JOHN F. DOWLING (Haddenham, Buckinghamshire, England)

During the winter of 1971-2 I received from a member of ASPEBA living in Spain a pair of Ortolan Bunting, *Emberiza hortulana*, which he had hand-reared. The male of this species is brown with dark streaking on back, wings and tail, russet-buff below, with an olive-green head and upper breast, and yellow on throat, moustache-streak and a thin ring around the eye. The female is browner on head and breast and has dark spots on the upper breast. The head feathers form a slight, peak-like crest at times.

Not having kept this species before and wishing to keep them warm I put them in a flight cage, 4 ft. 6 in. × 1 ft. 3 in. × 1 ft. 6 in., in my bird-room during the winter months and in the spring of 1972 put them in an outside flight, partly sheltered, 9 ft. × 6 ft. × 6 ft., together with three greenfinches, *Carduelis chloris*. They were given a seed mixture but appeared to eat hardly anything except plain canary seed and maggots. Some softfood was available and they were also given 5-6 mealworms a day, which they ate.

Thinking that they would nest low like a Yellowhammer I made several nest-sites close to the ground among growing hops and a small elderberry bush; while for the Greenfinches I also put in wicker baskets surrounded with a little evergreen foliage fixed about 4 ft. 6 in. up. During that season the hen bunting built a complete nest in one of the finch baskets, and then started a second directly on the ground in the open, ignoring the nesting sites in the hops. As far as I know no eggs were laid.

I saw virtually no courtship behaviour, apart from the fact that the cock occasionally offered live food to the hen, and also offered the dried grass used as nesting material. The cock sang his rather simple song usually in the late evening, continuing at times into the night and early morning. During this season the greenfinches bred successfully in the same aviary, ignored by the buntings.

I wintered the pair outside, and this spring, 1973, they started to carry nest material in late April; but before the hen could begin laying she was scalped and killed by the cock. During the subsequent breeding season, when the Greenfinches nested, the cock bunting tried to feed the young and interfered so much that I had to remove him.

During the autumn of 1972 I had received a second pair of these buntings. The male of this pair was very nervous, less brightly coloured and with a slightly dropped wing. The female was very boldly coloured and quite green on head and breast. I caged them for the winter as I had with the first pair and a few days after they came was surprised to find an egg on the cage floor. It was cracked so I broke it and found it to be fertile. The female did not then lay any more.

In May 1973 I put this pair in a flight 10 ft. \times 4 ft. \times 6 ft. 6 in. high, with access to a raised compartment in a bird-room 6 ft. \times 1 ft. 6 in. \times 2 ft. 6 in. high. The outside flight had plenty of growing honeysuckle and a small yew bush, and again I made some nest-sites at about ground level. I had never heard this second cock sing, nor seen any kind of mating or courtship behaviour, but early in June I noticed a lot of dried grass on the floor of the inside flight, which is wooden and painted glossy white. It looked as though the hen had tried to build a nest in one corner but could not shape it because of the slippery floor.

I was not quite sure what to do but in the end I put three clods of dry earth around one corner of the inside flight leaving enough room behind them for a nest. The site was ignored for several days, but on 24 June the hen started building here and on 25 June it looked finished. One egg was laid in the nest on 27 June and others on the two subsequent days. On 29 June the hen was on the nest. This was the first time I had seen her anywhere near it. When I fed the birds that evening I found a soft-shelled egg on the floor, so I presumed that she was sitting on three.

During the incubation period I saw the hen off the nest only two or three times. She usually sat very tight even when I was moving about and feeding birds. Two young hatched from the eggs on 12 July and the third egg did not hatch. On 15 July one young one was dead. After this date I often found the hen off the nest, but the remaining young one, which was covered with whitish down, always appeared well-fed. During this period I fed the small maggots sold as "squats" and small mealworms $\frac{1}{4}$ to $\frac{1}{2}$ in. long, later putting cut mealworms on softfood. The hen was seen carrying these but I have never seen either parent actually feed the young one, although I have seen the hen on the edge of the nest with live food in her bill.

On 20 July the youngster was seen perched on the edge of the nest. On 23 July it left the nest completely and after this for a week it darted for cover every time I went near the flight. On 30 July I was able to watch it for the first time without it flying for cover. It was pale buff with fine streaking on the face and underside, and buffish-brown with darker streaking on the back. It had a pale buff throat, moustache-streak and eye-ring; showing none of the colour of the adults.

At the time of writing in early September the young one is fully independent and well.

As described above the Ortolan Bunting *Emberiza hortulana* has been bred by J. F. Dowling. It is believed this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Assistant Editor.

* * *

RECORDS OF BREEDINGS UNDER CONTROLLED CONDITIONS IN BRITAIN

PART 4

By C. J. O. HARRISON (Berkhamsted, Herts., England)

This part completes the list of passerine birds with honeyeaters to tyrant-flycatchers. Pt. 1, crows to starlings, appeared in vol. 78 (1972): pp. 169-172, pt. 2, weavers and waxbills in 78: 205-209, and pt. 3, finches to buntings, in 79 (1973): 96-100.

HONEYEATERS. (*MELIPHAGIDAE*).

NOISY MINER, *Myzantha melanocephala*. W. E. Suggitt. *A.M.* (4) 3 (1925): 265-267.

ZOSTEROPS. (*ZOSTEROPIDAE*).

NATAL WHITE-EYE, *Zosterops virens*. L. Lovell-Keays. *B.N.* (2) 6 (1915): 197-201.

INDIAN WHITE-EYE, *Zosterops palpebrosa*. W. T. Page. *A.M.* (3) 3 (1911-1912): 114-117.

SUNBIRDS. (*NECTARINIIDAE*).

MALACHITE SUNBIRD, *Nectarinia famosa*. Mrs. K. M. Scamell. *A.M.* 70 (1954): 158-162.

SCARLET-CHESTED SUNBIRD, *Chalcomitra senegalensis*. B. E. Reed. *A.M.* 71 (1965): 107-109.

WRENS. (*TROGLODYTIDAE*).

WREN, *Troglodytes troglodytes*. W. E. Teschmaker, *vide* E. Hopkinson. *A.M.* (4) 12 (1934): 316. (Bred in 1914).

TREECREEPERS. (*CERTHIIDAE*).

TREECREEPER, *Certhia familiaris*. F. Meaden. *A.M.* 74 (1968): 200-202.

NUTHATCHES. (*SITTIDAE*).

NUTHATCH, *Sitta europaea*. F. Meaden. *A.M.* 76 (1970): 10-11.

LONG-TAILED TITS. (*AEGITHALIDAE*).

LONG-TAILED TIT, *Aegithalos caudatus*. W. Painter. *A.M.* 72 (1966): 147-148.

TITS. (*PARIDAE*).

[GREAT TITS, *Parus major*. M. Amsler. *B.N.* (2) 4 (1913): 240-243. (Adults at semi-liberty)].

BLUE TIT, *Parus caeruleus*. M. Amsler. *A.M.* (5) 6 (1941): 195.

WARBLERS. (*SYLVIIDAE*).

WILLOW WARBLER, *Phylloscopus trochilus*. F. Meaden. *A.M.* 76 (1970): 11-12. (bred 1960).

COMMON WHITETHROAT, *Sylvia communis*. F. Meaden. *A.M.* 76 (1970): 9-10.

BLACKCAP, *Sylvia atricapilla*. W. E. Teschemaker. *A.M.* (3) 1 (1909-1910): 145-151. also. R. Suggitt. *B.N.* 8 (1909): 199-200.

AUSTRALIAN WRENS. (*MALURINAE*).

EASTERN BLUE WREN, *Malurus cyaneus*. R. Phillipps. *A.M.* 8 (1901-1902): 246-249.

FLYCATCHERS. (*MUSCICAPIDAE*).

SPOTTED FLYCATCHER, *Muscicapa striata*. W. E. Teschemaker. *Cage Birds* 16 Jan. 1915: 13. *et seq.*. Presumably the reference on W. T. Page's list *B.N.* (2) 6 (1915): 162.

RUFIOUS-BELLIED NILTAVA, *Niltava sundara*. K. A. Norris. *A.M.* 67 (1961): 175-181.

TICKELL'S BLUE FLYCATCHER, *Niltava tickelliae*. Rev. J. R. Lowe. *A.M.* 72 (1966): 115-117.

THRUSHES. (*TURDIDAE*).

AMERICAN ROBIN, *Turdus migratorius*. London Zoo. 1908 *et seq.* *L. Z. Repts.* and *A.M.* (3) 12 (1921): 107.

BROWN THRUSH, *Turdus fuscater*. P. W. Thorniley. *A.M.* (3) 1 (1910): 267-269.

MISTLE THRUSH, *Turdus viscivorus*. T. S. Thomson. *A.M.* 75 (1969): 243-249.

SONG THRUSH, *Turdus philomelos*. W. T. Page. *B.N.* (2) 7 (1916): 20. and A. H. Scott. *A.M.* (5) 6 (1941): 53.

REDWING, *Turdus iliacus*. H. Murray. *A.M.* 66 (1960): 166-167.

FIELDFARE, *Turdus pilaris*. T. S. Thomson. *A.M.* 75 (1969): 243-249.

BLACKBIRD, *Turdus merula*. W. T. Page. *B.N.* (2) 7 (1916): 20. and F. Verey. *A.M.* (4) 12 (1934): 182-184.

GREY-WINGED BLACKBIRD, *Turdus boulboul*. W. T. Page. *A.M.* (2) 7 (1908-9): 334. also London Zoo. 1909. *L. Z. Repts.*

- RING OUSEL, *Turdus torquatus*. V. A. V. Carr. *A.M.* (5) 5 (1940): 165-167, 233-234.
- TICKELL'S THRUSH, *Turdus unicolor*. London Zoo. 1904-1916. *L. Z. Repts.*
- GREY-BACKED THRUSH, *Turdus dissimilis*. London Zoo (J. J. Yealland). *A.M.* 75 (1969): 51
- JACKSON'S THRUSH, *Turdus abyssinicus*. W. R. Partridge. *A.M.* (5) 2 (1937): 279-280.
- OLIVE THRUSH, *Turdus olivaceus*, W. Shore-Baily. *A.M.* (4) 2 (1924): 255-256.
- HERMIT THRUSH, *Catharus guttata*. M. Amsler. *A.M.* (4) 5 (1927): 394-398.
- OLIVE-BACKED THRUSH, *Catharus ustulata*. C. Everitt. *A.M.* 65 (1959): 112-116.
- ABYSSINIAN GROUND THRUSH, *Zoothera piaggiae*. Winged World (B. S. Ward). *A.M.* 77 (1971): 168.
- ORANGE-HEADED GROUND THRUSH, *Zoothera citrina*. H. Astley. *A.M.* (3) 2 (1910-1911): 368 (orange-headed form bred). London Zoo 1912. *L. Z. Repts.* (white-throated form bred).
- BLUE-HEADED ROCK THRUSH, *Monticola cinclorhynchus*. Mrs. K. M. Scamell. *A.M.* 66 (1960): 167-170.
- BLUE ROCK THRUSH, *Monticola solitarius*. M. Amsler. *A.M.* (4) 9 (1931): 265-270.
- WHITE-CAPPED REDSTART, *Chaimarrornis leucocephalus*. Keston Foreign Bird Farm (W. D. Cummings). *A.M.* 71 (1963): 139-141.
- WHEATEAR, *Oenanthe oenanthe*. P. Wayre. *A.M.* 72 (1966): 153-154.
- ABYSSINIAN CLIFF-CHAT, *Thamnolaea cinnamomeiventris*. A. Ezra. *A.M.* (5) 2 (1937): 306-307.
- PIED BUSH CHAT, *Saxicola caprata*. Mrs. K. M. Scamell. *A.M.* 68 (1962): 162-164.
- STONECHAT, *Saxicola torquata*. W. E. Teschemaker. *B.N.* (2) 1 (1910): 365-368.
- WHINCHAT, *Saxicola rubetra*. W. E. Teschemaker. *A.M.* (3) 4 (1912-1913): 24-32.
- MOUNTAIN BLUEBIRD, *Sialia currucoides*. A. Ezra. *A.M.* (5) 3 (1938): 220-221.
- WESTERN BLUEBIRD, *Sialia mexicana*. A. Ezra. *A.M.* (5) 2 (1937): 243-244.
- EASTERN BLUEBIRD, *Sialia sialis*. London Zoo. 1860. *L. Z. Rept.* and D. Seth-Smith. *A.M.* (3) 12 (1921): 107.
- BLACK REDSTART, *Phoenicurus ochrurus*. W. E. Teschemaker. *A.M.* (3) 3 (1911-1912): 293, 330-335. Also eastern form, *P. o. rufiventris*, Mrs. K. M. Scamell. *A.M.* 73 (1967): 156-158.

- DAURIAN REDSTART, *Phoenicurus aurea*. Mrs. K. M. Scamell. *A.M.* 66 (1960): 216-218.
- COMMON REDSTART, *Phoenicurus phoenicurus*. W. E. Teschemaker, *per* W. T. Page. *B.N.* (2) 7 (1916): 185. *see also* C. J. O. Harrison, *A.M.* 77 (1971): 134.
- DYAL BIRD, *Copsychus saularis*. London Zoo. 1873. A. G. Butler, *Foreign birds for cage and aviary* 1 (1906): 146.
- SHAMA, *Copsychus malabaricus*. R. Phillipps. *A.M.* 4 (1897-1898): 138-142.
- WHITE-HEADED ROBIN-CHAT, *Cossypha albicapilla*. A. Ezra. *A.M.* (5) 4 (1939): 304.
- WHITE-BROWED ROBIN-CHAT, *Cossypha niveicapilla*. Birdland (L. Hill), *per* P. Barclay-Smith. *A.M.* 74 (1968): 25.
- ROBIN, *Erithacus rubecula*. C. Smith. *Zoologist* 27 (1869): 1865.
- RUBYTHROAT, *Calliope calliope*. Mrs. K. M. Scamell. *A.M.* 68 (1962): 155-158.
- INDIAN BLUE CHAT, *Luscinia brunnea*. Mrs. K. M. Scamell. *A.M.* 75 (1969): 265-270.
- NIGHTINGALE, *Luscinia megarhyncha*. H. Hanley. *Proceedings of Zoological Society of London* 1851: 196-197.
- SPROSSER, *Luscinia luscinia*. W. E. Teschemaker. *A.M.* (3) 3 (1911-1912): 330-335.

BABBLERS. (*TIMALIIDAE*).

- BEARDED REEDLING, *Panurus biarmicus*. L. Lovell-Keays. *A.M.* (3) (1914-1915): 358-364.
- BLACK-CHINNED YUHINA, *Yuhina nigrimentum*. T. Shute, *per* W. J. Painter. *A.M.* 71 (1965): 84.
- BLACK-HEADED SIBIA, *Heterophasia capistrata*. A. Sheriff. *A.M.* (4) 3 (1925): 185-188.
- BLUE-WINGED SIVA, *Minla cyanouroptera*. D. G. Osborne. *A.M.* 77 (1971): 73-75.
- SILVER-EARED MESIA, *Leiothrix argentauris*. R. Franklin. *A.M.* 78 (1972): 83-84.
- PEKIN ROBIN, *Leiothrix lutea*. R. Farrar. *A.M.* (2) 1 (1902-1903): 407. *also* W. T. Page. *B.N.* (2) 6 (1915): 269-273.
- CHINESE JAY-THRUSH, *Garrulax chinensis*. H. Kenway. *vide* A. Silver. *A.M.* (4) 12 (1934): 304. *also* E. Hopkinson, *op. cit.* p. 316.
- MASKED JAY-THRUSH, *Garrulax perspicillatus*. London Zoo (J. Yealland). *A.M.* 71 (1965): 8.
- WHITE-CRESTED JAY-THRUSH, *Garrulax leucolophus*. Mole Hall Wildlife Park. *Int. Zool. Yearbook* 10 (1970): 302. (bred 1968).
- RUFIOUS-BELLIED BABBLER, *Dumetia hyperythra*. R. S. de Q. Quincey. *A.M.* 67 (1961): 56-58.

DUNNOCKS. (*PRUNELLIDAE*).

RUFOS-BELLIED DUNNOCK, *Prunella strophiata*. W. E. Teschemaker. *A.M.* (2) 7 (1908-1909): 359-362.

COMMON DUNNOCK, *Prunella modularis*. W. E. Teschemaker. *A.M.* (2) 6 (1907-1908): 92-96.

MOCKING-BIRDS. (*MIMIDAE*).

MOCKING-BIRD, *Mimus polyglottus*. R. Farrar. *A.M.* (2) 1 (1902-1903): 407.

CATBIRD, *Dumetorum carolinensis*. R. Farrar. *A.M.* 8 (1901-1902): 226-228.

WAXWINGS. (*BOMBYCILLIDAE*).

WAXWING, *Bombycilla garrulus*. F. Meaden. *A.M.* 70 (1964): 191-195. *A.M.* 76 (1970): 12-15. (Bred 1962).

SHRIKES. (*LANIIDAE*).

GREAT GREY SHRIKE, *Lanius excubitor*. M. D. England. *A.M.* 77 (1971): 1-10. (*L. e. lahtora* bred).

RUFOS-BACKED SHRIKE, *Lanius schach*. M. D. England. *A.M.* 77 (1971): 219-223.

RED-BACKED SHRIKE, *Lanius collurio*. A. Günther. *A.M.* (2) 2 (1940): 339-346.

LEAFBIRDS. (*IRENIDAE*).

FAIRY BLUEBIRD, *Irena puella*. Keston Foreign Bird Farm (W. D. Cummings). *A.M.* 71 (1965): 139-141.

BULBULS. (*PYCNONOTIDAE*).

WHITE-CHEEKED BULBUL, *Pycnonotus leucogenys*. Mrs. Mahon. *B.N.* (2) 1 (1910): 300-301.

RED-WHISKERED BULBUL, *Pycnonotus jocosus*. W. E. Teschemaker. *A.M.* (2) 8 (1909-1910): 208-212.

RED-VENTED BULBUL, *Pycnonotus cafer*. London Zoo. *vide* D. Seth-Smith. *A.M.* (2) 6 (1907-1908):

BLACK BULBUL, *Hypsipetes medagascariensis*. Mrs. K. M. Scamell. *A.M.* 71 (1965): 165-168.

WAGTAILS AND PIPITS. (*MOTACILLIDAE*).

PIED/WHITE WAGTAIL, *Motacilla alba*. London Zoo. Yarrell's British Birds. 4th. Edn. 1874. 1: 543. (*M. a. yarrelli* bred). W. E. Teschemaker. *A.M.* (3) 4 (1912-1913): 232-237. (*M. a. alba* bred).

GREY WAGTAIL, *Motacilla cinerea*. Rev. J. R. Lowe. *A.M.* 62 (1956): 216-217.

- YELLOW WAGTAIL, *Motacilla flava*. W. E. Teschemaker. *A.M.* (3) 5 (1913-1914): 81. (*M. f. flavissima* bred).
- MEADOW PIPIT, *Anthus pratensis*. E. B. Hall, *vide* C. Hopkinson. *A.M.* (5) 4 (1939): 64.
- ROCK PIPIT, *Anthus spinoletta*. W. E. Teschemaker. *vide* W. W. T. Page. *B.N.* (2) 3 (1912): 338.
- TREE PIPIT, *Anthus trivialis*. W. Painter, *pers. comm.* and *Occ. Pap. A.S.P.E.B.A.* 1 (1967): 1.

LARKS. (*ALAUDIDAE*).

- WHITE-CHEEKED FINCH-LARK, *Eremopteryx leucotis*. W. Shore Baily. *B.N.* (2) 8 (1917): 133-135.
- BLACK LARK, *Melanocorypha yeltonensis*. R. Phillipps. *A.M.* 5 (1899): 169-176.
- WOODLARK, *Lullula arborea*. T. Kinchington. *Occ. Publs. A.S.P.E.B.A.* 3 (1969): 15-16.
- SKYLARK, *Alauda arvensis*. P. Wayre. *Norfolk Wildlife Park Repts.* 1969, 1970.
- CRESTED LARK, *Galerida cristata*. W. E. Teschemaker. *A.M.* (3) 3 (1911-1912): 273-280.

TYRANT-FLYCATCHERS. (*TYRANNIDAE*).

- KISKADEE FLYCATCHER, *Pitangus sulphuratus*. Chester Zoo (M. F. Coupe). *A.M.* 71 (1965): 145.

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NEWS AND VIEWS

According to the 94th Annual Report of the Royal Zoological Society of South Australia 25 species of Parrots were hatched and raised in the Adelaide Zoo last year. Especially notable among them were 2 Musk Lorikeets, 2 Rock and 3 Hooded Parrakeets and 2 Red-tailed Black, 4 Leadbeater's and 2 Slender-billed Cockatoos.

* * *

Unfortunately, the Red Shining Parrakeet hatched earlier this year at the San Diego Zoo has died but, according to Dr. Jim Dolan, the Blue-crowned Lories are progressing very well.

* * *

A. V. Marques has succeeded in breeding the Sun Conure. Two perfect youngsters left the nest-box in June and now (September) the parents have another three well-grown chicks. The species has been bred in captivity once before, in Florida, but this is almost undoubtedly the first occasion on which it has been bred in Europe.

The pair of Iris Lorikeets belonging to R. Kyme hatched a chick in July which progressed well until it was about 30 days old when it died. This species has not been raised in Europe but has on several occasions in the San Diego Zoo. Several other breedings with a more successful outcome have occurred in Mr. Kyme's aviaries and this year his birds have produced 4 Stanley and 3 Mealy Rosella, 3 Splendid, 1 Turquoise and 1 Yellow Redrump Parrakeets in addition to 4 Azara Conures. His collection has recently been supplemented by several species of rare Lories and Lorikeets and the aviaries are now inhabited by pairs in perfect condition of such rarities as Duyvenbode's, Dusky and Yellow-streaked Lories and Iris, Meyer's and Fair Lorikeets.

* * *

Mr. J. J. C. Mallinson, Zoological Director of the Jersey Wildlife Preservation Trust, writes: "During the first months of this year up to 1st May we have bred the following birds: 10 Cape Barren Geese, 4 Speckled Mousebirds, 3 Rothschild's Mynahs, 4 Triangular Spotted Pigeons, 2 Canadian Horned Eagle-Owls (hand-reared from a day old), 3 Keas and 1 Palawan Peacock Pheasant. New arrivals include 1 female White Eared Pheasant from East Berlin Zoo, 1 pair Coscoroba Swans and 1 Roul Roul Partridge. We have just completed building a six-unit specially designed Palawan Peacock Pheasant range. The aviaries have a shut off area at the back, and an outside area measuring 12 ft. wide \times 20 ft. long, and these are planted with shrubs and have a 4 ft. \times 5 ft. pane of glass in the front of each unit. It is hoped to establish a viable breeding group of this endangered species, on the same lines as we have done with our White Eared Pheasant, of which the Trust now owns 42 specimens."

* * *

Although two members of the genus *Charmosyna* were bred successfully just before the First World War by Brook in Scotland, the stock died out and the possibility of ever seeing again specimens of these glorious Lorikeets in our aviaries appeared very remote. A few Stella's Lorikeets were imported privately in the 1930's and went to the collection of the late A. Ezra at Foxwarren Park where they flourished but did not breed. Except for these, it is unlikely that any other specimens of the genus appeared in this country for 50 years. It was a big avicultural event, therefore, when a private importer succeeded recently in obtaining a single specimen of the Papuan Lorikeet which is now reported to be thriving in the collection of Raymond Sawyer. Even more exciting was the acquisition by the same enterprising importer of more than 20 Fair or Fairy Lorikeets (*C. pulchella*) all of which arrived in excellent condition. This tiny, colourful species, about the length of a Budgerigar

but of considerably smaller body size, is truly what the late Duke of Bedford would have described as an "exquisite psittacine gem". Let us hope that the unique opportunity not only to emulate Brook's success but also to establish an aviary breeding strain will not be wasted.

* * *

When I first joined the Avicultural Society, almost 30 years ago, one of the most regular contributors to the magazine was Dr. Alan Lendon. Almost every species of Australian parrakeet bred successfully in his aviaries, and I remember well his series of articles in the magazine which ultimately were published in book form. More recently he wrote about the Golden-Shouldered Parrakeet, the Cloncurry Parrakeet and the Blue-cheeked Rosella all of which he did much to establish as aviary strains in Australia. He is not only an ardent aviculturist but also a very keen bird watcher and his accounts of birds in the wild, some of which have also appeared in the AVICULTURAL MAGAZINE, have made fascinating reading. For years I have wanted to meet Dr. Lendon but my ambition was fulfilled only recently when I visited Adelaide early this year. The few days which I spent mainly in his company represent a highlight of my avicultural career. Together we visited some of the parrot collections in the vicinity of Adelaide and spent several hours watching the host of species of waterfowl which thrive on the South Australian salt pans. I shall write about the species we saw on another occasion, but the most exciting to me were White-backed Wrens and my, first Grass Parrakeets in the wild, a pair of Elegants. Dr. Lendon is still a practising aviculturist but he has reduced the size of his collection considerably and now keeps pairs of rare species like Golden-shouldered, Hooded and Orange-bellied Parrakeets as well as Leadbeatter's Cockatoos and a breeding colony of African Grey Parrots.

J. R. HODGES.

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Additional Note

It is with great regret that news has been received of the death of Dr Lendon.—EDITOR.

ANNUAL DINNER

The Annual Dinner was held on 17th September, 1973, at the Clive Hotel, Hampstead, London, N.W.3.

Present: Dr. Jean Delacour (President), Mr. Walter Van den bergh (Director of Antwerp Zoo) and Mme. Van den bergh, Mr. Colin Rawlins (Director of London Zoo) and Mrs. Rawlins, Mrs. Nicole-Duplaix Hall (Editor, International Zoo Yearbook).

Members: D. Ashley, Miss P. Barclay-Smith, Mrs. W. Duggan, C. Everitt, Miss R. Ezra, I. G. Hale, C. J. O. Harrison, R. T. Harvey, Mrs. M. Haynes, L. W. Hill, H. J. Horswell, Dr. J. Kear, Dr. S. B. Kendall, R. T. Kyme, P. J. Olney, Mrs. G. Schomberg, G. Schomberg, Mrs. C. L. C. Ward, J. R. Wood, J. J. Yealland.

Total attendance: Members—22, Guests—19.

After an excellent dinner, Dr. Delacour presented the President's Medal to Mr. Walter Van den bergh in recognition of his outstanding services in the cause of aviculture

In making the presentation, Dr. Delacour spoke of his memories of the Antwerp Zoo which he first visited as a boy in the early 1900's and of how the Gardens had suffered in the two world wars. Under the directorship of Mr. Walter Van den bergh, the Gardens and the Collection had been transformed to their present excellence. Dr. Delacour also spoke of the work done by Mr. Van den bergh and his colleagues in the breeding of the Congo Peacock and the reconstitution of the Imperial Pheasant from the single living specimen available to him, the latter species now being almost certainly extinct in its native Indo-China, and of the achievements at Planckendael, the Antwerp Zoo's country estate where many species of birds are bred. It was for Mr. Van den bergh's outstanding contribution to aviculture that he was being presented with the President's Medal, only the fourth to be awarded in the long history of the Society.

In reply, Mr. Van den bergh expressed his deep appreciation on behalf of himself and his colleagues for the honour bestowed on him.

* * *

VISIT TO CHESTER ZOO

Thirty-eight Members of the Society, including the President, Dr. Jean Delacour, visited Chester Zoo on 19th September 1973, at the kind invitation of the Director, Mr. George Mottershead, and the Council of the North of England Zoological Society.

Members assembled at 12.30 for sherry which gave a rare opportunity for southern and northern Members to meet each other. After a delicious luncheon, Mr. Mottershead and Mr. W. Timmis, Curator, took the party on a fascinating tour of the Zoo.

There was so much to admire in the beautifully landscaped and planted gardens, the well-designed buildings which were both functional and attractive, and the many rarities amongst the exhibits, that it would be hard to single out the most enjoyable feature, but probably the magnificent Tropical House held the Members' interest for longest.

The time passed far too quickly and after meeting again for tea at 5.0 p.m., Members with long journeys reluctantly had to leave.

I am sure that all Members would wish to thank Mr. Mottershead and his staff most sincerely for their warm hospitality and for giving the Society such an interesting and enjoyable day.

Hon. Secretary.

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REVIEW

PIGEON RACING. By H. R. AXELROD and E. C. WELTY JR. London: The Oak Tree Press, 1973. Price £2.50.

As a boy I kept and flew Racing Pigeons for my own amusement. During part of the war I was in the Middle East Pigeon Service, an organisation which gave me a great deal of time to watch Racing Pigeons. I have, however, never indulged in the competitive sport of pigeon racing so it must be understood that I am only qualified to review this book as an ornithologist and pigeon-addict, not as one directly involved in the sport in question.

The book starts off with a refreshing lack of false modesty: "Just follow my suggestions . . . compare them with any other advice you have been given. I am sure you will have little trouble in being consistently among the top winners". The pigeon racer's love for his birds is emphasised; much in the book makes it clear that this love is conditional upon the birds performing as their owner dictates and desires. This being so, it is perhaps as well that the statement (p. 10) that "... the pigeon loves Man . . ." is demonstrably untrue as a generalisation even though it may be valid for a few individual pigeons.

Information on the keeping, breeding, training and flying of Racing Pigeons is given in detail. In spite of this being, as we are assured, based on personal experience, it often reads surprisingly like a compilation. It is, for example, surprising that anyone who has looked closely at, let alone handled, a blue chequer (the commonest colour pattern in Racing Pigeons) can write (p. 83): "A checker occurs when a pigeon's basic colour is covered with small feathers of a darker shade—". Some other statements also seem questionable or at least not applicable to all Racing Pigeons, for example, that "very little attention is paid to the first egg" (p. 56).

The widowhood system is fully explained. The section on this should be of thought-provoking interest for all students of bird behaviour, especially any who doubt whether birds feel emotions as strong, illogical, and easily manipulated by the unscrupulous as our own. The book is very fully illustrated with sketches, diagrams and a large number of excellent photographs. These latter include adult Racing Pigeons of almost every colour pattern, young of varying ages, and a few fancy breeds.

D. G.

* * *

NOTES

TANAGER DISPLAY

Last year I promised a note on the sexual behaviour of a pair of Paradise Tanagers, *Tangara chilensis*. In June 1972 I one day observed the male of a pair appearing from a hawthorn bush with a bamboo-leaf carried crosswise in the bill. He landed at the side of the female with the feathers ruffled, the wings drooped and shivering, and beak and tail pointed upwards. This happened several times during the period of observation. Each time he entered the bush on one side and emerged at the same place on the other side, uttering a "si-si-si-si-si" call in a falling cadence. He reminded me to a high degree of the Cordon Bleu, *Uraeginthus bengalus*. I was unfortunately in hospital a few days later, but on returning a month later I again saw the same behaviour once or twice, before the pair were killed by some other inmates.

Once I have seen a male Golden-eared Tanager, *Tangara chrysotis*, crouched feathered to a shelf, raising the ear-coverts in a similar manner to those of the Violet-eared Hummingbird, *Colibri coruscans*, and giving the head a somewhat snake-like appearance. This was the only occasion on which I observed this behaviour.

E. NØRGAARD-OLESEN.

* * *

NOTICE

FIRST BREEDING OF THE SILVER-EARED MESIA

Mesia argentauris

The breeding of the Silver-eared Mesia by R. Franklin was reported in the Magazine, vol. 78 (1972) : 83-84. We have not found an earlier account of the successful rearing of this species to a point where the young were independent. It seems possible that the above account may represent a first breeding. Any member or reader knowing of a breeding of this species in Great Britain or Northern Ireland prior to the above is requested to communicate at once with the Assistant Editor.

The Editor does not accept responsibility for opinions expressed in articles, notes, or correspondence.

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AVICULTURAL MAGAZINE



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THE AVICULTURAL SOCIETY

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Spotted Morning Warbler



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Spotted Morning Warbler on nest

[John Midwinter

AVICULTURAL MAGAZINE

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NOVEMBER–DECEMBER 1973

BREEDING OF THE SPOTTED MORNING WARBLER, *Cichladusa guttata*, AT BIRDLAND

By L. W. HILL (Bourton-on-the-Water, Glos., England)

Birdland possessed one Spotted Morning Warbler: and in 1971 a second one was purchased, which, after a period of re-adjustment under the care of John Midwinter, who is excellent in these matters, was put into my Tropical House where it very fortunately proved to make a pair. The Tropical House is well-vegetated and maintained at a temperature of about 70 degrees Farenheit.

After a few months it was noticed that the birds were trying to make small piles of mud on the Palm Tree leaves. It was hardly believable that this was nest-building, but both birds were very busy at their objective. One day in 1972 a small mud nest was observed on top of a small girder. It was approximately $3\frac{1}{2}$ ins. high and the bird was sitting on it. The nest resembled a minute Flamingo's nest except for the lining of plant material. Eggs were laid and a chick hatched.

Full success was achieved early in 1973. On 23rd April both birds were frantically building a nest on the same small girder. On 26th April the hen was sitting on the nest, probably all day. It was assumed that the first egg had been laid. On 11th May there was a young one in the nest, being fed with mealworms and maggots; and on 24th May it left the nest and was really airborne in the next two days.

Since then the birds have nested several times and single young again been reared.

.

As described above, the Spotted Morning Warbler, *Cichladusa guttata* has been bred at Birdland, Bourton-On The Water. It is believed this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Assistant Editor.

The cost of the colour blocks illustrating L. W. Hill's article has kindly been given by the author.

THE BREEDING OF THE SPOTTED MORNING WARBLER, *Cichladusa guttata*, AT THE WINGED WORLD

By BRYAN S. WARD (Heysham, Lancs., England)

The Spotted Morning Warbler, sometimes known as the Spotted Morning Thrush, is a small thrush-like bird of six and a half inches. Its upper parts are a dull rufous brown with a creamy-buff eye stripe, whilst below is also creamy buff, heavily marked with large black spots. The tail is cinnamon. There are three species of Morning Warbler all confined to Africa. The Spotted Morning Warbler is found in the southern parts of the Sudan spreading southwards through Ethiopia, Uganda and Kenya down to central Tanzania.

They are comparatively rare in captivity, possibly due to the fact that they are not one of the more brightly coloured species which a lot of people seem to prefer, although in a quiet sort of a way they are very attractive birds and have an extremely pleasant song. This is usually heard in the early morning and late evening. The sexes are more or less alike, but the cock appears to have larger spots than the hen.

We have kept this species in Winged World for a number of years and have found them extremely easy to cater for; their requirements being a good soft food mixture and live food such as maggots and mealworms. Our original two birds built a number of nests over quite a long period of time. These were made mainly with mud, mixed with the odd piece of dried grass or rootlets and shaped into a deep cup approximately four inches across overall, perfectly rounded, and about three inches deep, the mud being nearly half an inch thick. These were invariably built on the top of a vertical branch with a minimum width of three inches, where the higher portion had been broken off leaving a rough finish.

They laid two pale greenish-blue eggs and incubated for twelve days plus, they then left the nest which ultimately collapsed. As mentioned above, this happened on a number of occasions, it wasn't until we found four eggs in one nest that we realised that we had two hens. We then attempted to obtain two more birds, with the idea that out of four birds we would have a better chance of getting a true pair.

Our two new acquisitions arrived in September 1972 and as one of them was more heavily spotted than the other we thought that we could have a true pair with these birds, and consequently released them both into one of our planted compartments.

Within a month they had started carrying mud up into a rubber tree and were attempting to fix it onto a sloping branch, with hopeless results. We then decided to help by fastening a piece of plastic netting horizontally, near to where they were trying to build. They did construct a nest onto this, but that too was unsuccessful.

A wicker nest-basket was then fixed up earlier this year close to the plastic mesh and some mud was pressed into the bottom and sides to give them a little encouragement. This they readily accepted and ultimately laid their eggs in, without very much more nest building. They incubated for approximately twelve days. It is impossible to be more accurate, as the necessity of placing the nest in a secure place also made it difficult to obtain good visibility owing to the foliage around it.

The chicks duly hatched, one was found on the floor beneath the nest at an approximate age of two days, the other one leaving the nest fifteen days from the assumed time of hatching. In colouring the young bird resembles its parents, but is considerably smaller. Even so, it was flying quite strongly on first leaving the nest on 1st July.

* * *

BREEDING THE SILVER BIRD

(*Empidornis semipartitus*)

By MRS. K. M. SCAMELL (St. Keverne, Cornwall, England)

This very attractive, graceful and unusual Flycatcher is not often imported into this country and I have not seen others than those we have obtained ourselves direct from Roberts Wildlife of Lake Baringo, western Kenya. There are three races, the nominate race from northern Ethiopia where it is stated to be common in dry thorn country, *havirondensis* which ranges from South-east Sudan, Uganda, the western half of Kenya to north Tanzania and the third race *orleansi* which ranges over parts of western, central and southern Sudan into western Ethiopia. The nominate race is said to be slightly darker above than the other two races and the wings and tails of *havirondensis* are longer than either of the other two races. We believe that some of the Silver Birds we have imported have been *havirondensis* and possibly two of them *orleansi*. The adults vary in length from a little under 7 ins. to $7\frac{1}{2}$ ins and in colour are a silvery grey above with the primary feathers dark grey. Below they are a deep tawny. Both sexes are alike.

Our experience has been that Silver Birds are more sociable among themselves than any other flycatchers we have kept. Even in the breeding season we have had three of these adult birds in one aviary and though there was some chasing there was no fighting. They are not to be trusted in a mixed aviary with smaller birds. There is no territory song but both sexes have a low and sweet song and call which is most distinctive.

In June 1966 we imported a pair of Silver Birds with their own

youngster which was still in juvenile plumage. We housed them in a planted aviary with a flight 9 ft. \times 6 ft. \times 6 ft. and a shelter 6 ft. \times 6 ft. \times 6 ft. high. Though all three birds appeared to be in excellent condition within a month the hen started to spit and sneeze and quickly died. A postmortem showed respiratory parasites. The cock developed the same symptoms but after a few days in a hospital-cage and with a veterinary surgeon prescribing thiabendazole dusted on its mealworms for a week it seemed to recover, but not for long as it died later that summer. The young bird never developed the parasite and is still in perfect condition now, seven years later. The next problem was to get a mate for our unsexed bird still in juvenile plumage and it was not until May 1969 that we were successful. From the behaviour of the two birds in the aviary we felt sure we had a true pair, the new arrival, being slightly deeper in colour below, broader and a little longer, was a male and our three year old bird a hen. Within a few days the latter started building a nest in an open-fronted nest-box in the shelter. According to the "African Handbook of Birds" Vol. 2 by C. W. Mackworth-Praed and Captain G. H. B. Grant, from which book we have also obtained most of our information on the nesting behaviour, range and races of the species in their natural surroundings which is mostly open acacia bush, the nominate race appears invariably to breed in old weaver nests, usually those of the White-headed Buffalo Weaver *Dinemellia dinemelli*. The other two races either build a large nest of dry grass with a roof of thorny twigs or use the nest of other species particularly those of the larger Weavers.

By the 13th June our 1966 hen had cleared up all the dried grasses and loosely twisted string or cord which we tease out and supply as a nesting material to many of our birds. The nest-box was soon filled to overflowing with an untidy mass of material and bore little resemblance to a nest. On the 22nd June it seemed that she was making no progress so we fixed up another nest-box in the flight—this time with an entrance hole. She quickly switched to this box but was intimidated by a cock Tacazzi Sunbird, one of a pair nesting in the adjacent aviary, and soon returned to her shelter nest-box. We then moved the nest-box from the flight to the shelter to give her the choice of the two but she still preferred the open-fronted one. On 1st July another pair of Silver Birds arrived from Kenya. They were in perfect condition but as I was so sure that we already had a true pair I let a friend of ours have the new arrivals.

Throughout the summer nest building continued but the hen seemed unable to finish it off. It almost filled the nest-box by now, with the entrance high up. The grasses and teased string all seemed to be laid in one direction and not woven in any way. Feathers and other nesting materials were ignored. We were convinced by this time that this particular bird was incapable of building a nest to her satisfaction and was probably descended from a long line of Silver Birds which use discarded Weaver nests so we sent to Kenya for such a nest! When it arrived we

placed it inside another open-fronted nest box which it almost filled—but the hen never took a look at it though we watched for hours over many days.

In June 1970 the hen commenced nesting again in the open-fronted box in the shelter after the two birds had wintered together in the same aviary. She spent most of her time in the nest, sometimes remaining in it when I came into the shelter to feed. At intervals I checked the nest but no eggs were laid. She seemed to prefer long lengths of the teased-out string or cord and threw out all the short lengths she had used earlier. As last year she remained unsatisfied with the result and so passed another frustrating summer for the birds and ourselves! In September our aviaries were dismantled and in October we moved to Cornwall with the Silver Birds, other softbills and some nectivores. Both birds spent the winter in cages in the bird room at our new home until an aviary was ready for them. Early in the Spring of 1971 the male Silver Bird died. It had been ailing for some time and though separately caged from the hen, it had never really settled down since our move. The 1966 hen was placed in its new aviary with two Ant Thrushes which are ground birds, while we awaited the arrival of two more Silver Birds from Kenya. Though without a mate that summer she nested continuously in an open-fronted nest-box in the flight.

The two new Silver Birds arrived on 31st August 1971 and seemed a pair. It was a bit late in the year to try and acclimatise them in the same aviary as the 1966 hen so after a short period in a cage together we transferred them to a small aviary with a heated shelter and let them out on fine days only for the next eight months. All three birds called to each other frequently.

On 21st April 1972 we transferred the Ant Thrushes to another aviary and replaced them by the two 1971 Silver Birds, shutting the three birds in the shelter each night and releasing them to the flight each morning. The three birds agreed and no fighting took place. Two food pots were supplied always. The flight is 21 ft. long by 6 ft. wide and is 6 ft. 6 ins. high. The shelter measures 6 ft. \times 4 ft. \times 7 ft. 6 ins. high and is a compartment of our birdroom which we keep at a minimum of 45°F in the winter. The open-fronted nest-box of $\frac{1}{2}$ in. wood measures inside 5 ins. wide, 6½ ins. deep 4½ ins. high in front and 5½ ins. high at the back, is placed just outside the shelter window about 6 ft. from the ground and facing west. It is at the north end of the flight and is under a flat roof which covers the flight for about 4 ft. of its length. This flat roof gives the nest-box cover from rain and direct sunshine. The aviary runs from south to north and is heavily planted. There are two hydrangeas, a 4 ft. high hedge of *Lonicera nitida* about 10 ft. long, two fuchsias, two small black alders, a eucalyptus tree up to the roof and which requires much pruning, a veronica and a few spirea which are grouped around the nest-box area and give it some privacy. Outside the flight on the west side are three more eucalyptus trees about 5 ft. or 6 ft. high and several alder about 10 ft.

to 12 ft. in height. On the north side there is a small wood of deciduous trees which screens the aviaries from a road which is busy in summer and helps to break the cold spring winds we seem to get. All this is ideal cover yet the flight receives ample sunshine from the south and west. Other nesting-boxes were erected but no interest was shown in them as the old hen again resumed nesting in her old box.

At first it meant shutting the birds in the shelter each night as the spring was cold until the middle of May, particularly at night. As in the past, the 1966 hen had a busy summer, building and rebuilding her nest and sitting in it for days at a time except when she fed. No eggs were laid. The 1971 pair gave her a wide berth but made no attempt to nest themselves. About this time we had started breeding locusts and these became a part of the daily diet. They were readily taken, mostly by the cock. So another summer and winter passed, the three birds in the flight by day from October to March and in the shelter at night.

In March 1973 when it came to the nightly job of shutting the birds in the shelter, the 1971 hen became more and more reluctant to enter so for her own safety we caught her up and caged her and now hoped the old hen and the 1971 cock would pair and breed. On June 1st no progress had been made so we rather sadly came to the conclusion she would have to be removed from the aviary and caged. We replaced her by the 1971 hen. During the next few days there was some wild chasing of the hen by the male—up and down the flight for minutes at a time following which they would perch together. Though we never saw them mate, we did feel they were compatible. The question was, would the hen be capable of completing a nest or would she behave like the 1966 hen? We had not long to wait; on 8th June just eight days after we had transferred her to the aviary, there was a well finished and domed nest in the same nest-box plus one egg! The entrance hole was at the top and the materials were the same, teased out string or cord and some raffia.

The weather was now very hot for this part of Cornwall, about 73°F. Incubation continued normally and when I checked the nest on the 22nd June there were three eggs, one more than is normal in Africa. At 10 a.m. on the 23rd June I saw an eggshell fragment near the water pot about 18 ft. from the nest. This was the 16th day since the first egg was laid and 14 days since incubation had started. From then on we gave mealworms *ad lib.* (instead of about 10 each twice daily, with a similar quantity of maggots plus insectivorous food which they will eat very well if they are rationed with live food). The weather was again very hot, 74°F, with almost unbroken sunshine. The nest-box under the flat roof must have been many degrees hotter so it was not suprising that the hen did not brood as much as one would expect. However we had the consolation of seeing her taking mealworms to the nest several times and saw both birds hawking for insects in and around the bushes. Whenever we have to give mealworms in quantity, which is usually when young birds

are in the nest, we always coat the mealworms with vegetable cooking oil and dust them just as lightly with "Vionate" vitamin/mineral additive. Either must not be done too freely or the mealworms become limp and the birds won't feed them. The next day we saw some livefood being carried to the nest, but in the afternoon both birds were perched together for long periods. It was again hot. Partly from curiosity and partly from our need to know how many chicks we were catering for (mealworms **can** be in short supply just when you need them and one requires a stock for safety), we shut the parents in the shelter and covered the window with newspapers while we checked the nest. There was one chick and two unhatched eggs which we left.

During the next few days the weather was cooler and more time was spent by the hen brooding. Only mealworms and locusts were fed by both parents, maggots were untouched. On the 1st July we observed the male kill a third instar locust and take it straight to the nest, the hen flying out as he arrived. The male then went in to feed. The door-framing at the end of the flight furthest from the nest was by now plastered with excreta sacs deposited by the male. The hen dropped the sacs she carried into the larger hydrangea. By this time we were supplying about $1\frac{1}{2}$ ozs. of mealworms and about 25 locusts a day. On the 6th July, the 14th day after hatching, both parents were observed for over an hour during the afternoon but were not seen to take food to the nest, so with the parents in the shelter and its window covered, I carefully put my hand in the nest-box and felt a silky, fully-fledged bird which seemed to fill the whole of the nest. Earlier in the day we had seen the mother carrying nesting material, hence our doubts. Live food usage started to drop and as the days went by without the young bird leaving the nest we began to wonder if all was well. On the 12th July I checked the nest again and again touched a warm silky bird.

The next morning at 7 a.m., the 21st day after hatching, a young robin-like bird was seen in the flight. It was spotted buff with darkish flecks on the head underparts and back. The tail, about $\frac{3}{4}$ in. long, was dull grey as were the wings. No second fledgling was found though we searched the flight from end to end. It was on a high perch at 2 p.m. and at 7 p.m. we shut it in the shelter with its parents just to be safe! There was only one unhatched egg (instead of the expected two) in the nest, so another search of the flight was made. We then let the cock out for a while knowing he would feed it if there was one, but he only fed himself. The egg, which I broke getting it out of the nest, is a pale shade of green with a light brown mottling mostly at the large end.

Next day was cool, 58°F maximum, and very wet, but the parents saw to it that the young bird stayed under the covered section of the flight and did not get wet. As the weather got worse in the afternoon we shut all three birds in the shelter and were able to observe it being fed with mealworms by both parents. The locusts were too large by this time,

but even so, the adult birds broke them up and swallowed them themselves—about eight, (fourth instar), went during the afternoon. The next three days were warm and included a two-hour thunderstorm from which all three birds sheltered. The hen was now rebuilding her nest and on the 19th July one egg was laid. The male parent was now doing most of the feeding and with a second clutch in the offing we dare not cut down on the mealworms in case they ceased to feed the young bird which was now flying strongly but as yet unable to feed itself. From the 20th July we stopped shutting the three birds in the shelter at night. The next day there were two eggs and a third on the 23rd July when the hen started incubating. The young bird had grown a lot and was very active. While the hen incubated the male did the feeding until the 28th July when we noticed she kept coming from the nest to feed the gaping youngster which the male was now ignoring. It was now time to separate the young bird, which we did at 6 p.m. and caged it well away from the hearing of its parents. It ate only a few mealworms up to 10 p.m., three from 5.30 a.m. next morning to 10 a.m. and 30 mealworms from 10 a.m. to 1 p.m.. From then on it was no trouble and within two days we had it eating the usual insectivorous mixture plus eight mealworms three times daily.

On the 4th August an eggshell was found in the flight, the 13th day after we thought incubation had started. I checked the nest on the 10th August and felt one chick and two eggs so it looked as if the other two eggs had been chilled as a result of interrupted incubation. On the 22nd August the fledgling left the nest, the 19th day after hatching. We did not shut the young bird or the parents in the shelter this time and noted that it returned to its nest many times and we believe it roosted there at night with the mother. On the 1st September there were two cold eggs in the nest and the hen commenced incubation on the 3rd September. We separated the young bird on the 5th September, the 15th day after leaving the nest. It was feeding itself within two hours. We checked the nest on the 15th September. There were three eggs again. One chick hatched on the 17th September, 15 days after we thought incubation had started. A second chick hatched later possibly next day and the pattern of feeding followed as for the previous clutches. After the hot summer we were now in a spell of storms and cold nights with night temperatures on occasion as low as 40°F. However two Silver Birds left the nest during a mild spell on 6th October the 20th day after the first chick hatched. It does seem that the extremes of weather made little difference to the incubation periods of 13 to 15 days and in the time to leave the nest, 19 to 21 days. I think supplying locusts gave some variety to the live food, mostly mealworms, and helped a lot in rearing these birds. With the latest two birds we did not shut them in the shelter until two days ago (11th October) when cold easterly gales and heavy rain compelled us to.

The Silver Bird hatched on the 23rd June is now moulting in an indoor flight in our birdroom. It still has some feathers to come but the spots have gone and the underparts are the same deep tawny as its parents. Also, like its parents, it is grey above with dark grey primary feathers. The Silver Bird hatched on the 4th August is now half patchy grey on the head and back replacing some of the fawn spots. It is still spotted fawn beneath but tawny feathers are spreading from the vent area. It is 6 ins in length. The tail feathers are dull grey and the primaries a dull dark grey. All four young birds are in fine condition.

Last year we ordered another Silver Bird to try and make up two pairs. It arrived from Kenya about two months ago. We think it is a male and it has been caged with the old 1966 hen ever since. They agree perfectly. Next year we hope to give her another chance to breed in an aviary with her new companion.

As described above, the Silver Bird, *Empidonis semipartitus*, has been bred by Mrs. K. M. Scamell. It is believed this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Assistant Editor.

* * *

BREEDING THE RUBY-THROATED OR BLACK-CRESTED BULBUL, *Pycnonotus melanicterus*

By MRS. K. M. SCAMELL (St. Keverne, Cornwall, England)

For some years when we lived in Newdigate, Surrey and since in Cornwall, we have kept in our aviaries a few Bulbuls of the species *Pycnonotus melanicterus*. Sometimes the birds are advertised for sale by dealers, but generally they have been difficult to purchase in this country. Some of these Bulbuls have had small raised crests, others have been crestless or almost so. One feature those we have kept had in common, was a ruby or red coloured throat.

The earliest importation into the U.K. of the Ruby-throated Bulbul was believed to be in 1904 and the aviculturist who kept them, Reginald Phillips, reports his experiences with the two birds in *Avicult. Mag.* (2)7(1908-9) : 215-219 : 236-240. I am also indebted to Dr. Colin Harrison for clarifying the present grouping of the various races of these Bulbuls and I cannot do better than to quote from a recent letter he sent me in reply to my enquiry on the matter:—

“The taxonomy of the bulbul is rather complex. All forms are now grouped as the species *Pycnonotus melanicterus*, which is given the name Black-crested Bulbul, probably a better one in view of the variation in throat colour. There is a yellow-throated, non-crested form in Ceylon,

and a yellow-throated crested form in Borneo. There is a red-throated crestless form in South-West India, a red-throated crested form in Eastern Thailand, and a red-throated orange-breasted form in Java (*dispar*). The remaining forms are black-throated and the crest is developed to varying degrees. At present 12 races are recognised by name”.

Our Ruby-throated Bulbuls measure about 7 in. in length. The head, nape and beak are black. The back, wings and tail are dark olive-green and the underparts pale yellow. The legs are brownish and the throat feathers, some of which tuft or bristle, are a deep red or ruby colour which fades somewhat in captivity. The iris is yellowish. The call sometimes has a single note and at other times a pleasing bubbly one of many notes. There is no territorial song.

We have found them reasonably hardy once established, although in winter it is essential to provide a minimum temperature of 45°F in the shelter. Feeding is simple—an insectivorous mixture (we make our own) into which we grate carrot and apple until it is nicely moistened. We then add soaked currants, cut-up soaked sultanas and cut-up figs and grapes. All the fruits are well dusted with Gevral-Protein. Maggots are not eaten and at times mealworms are also ignored or just a few taken. We have tried small locusts but these have been left also. During breeding periods mealworms are sometimes taken in quantity.

We purchased our first pair of Ruby-throated Bulbuls in 1964. From what country any of this species came from we have never been able to find out. This particular pair were of one of the crested races but it was not until 1966 that they showed any interest in nesting. As this came to nothing we moved them to a larger aviary planted with bamboo rhododendrum and privet. It measured 20 ft. in length, 4 ft. in width and 6 ft. 6 ins. in height, with a shelter measuring 4 ft. × 2 ft. × 7 ft. high and this they had to themselves. In May 1966 they were again seen carrying dried grasses to an open-fronted nest-box placed high up near the roof of the flight and concealed somewhat by privet. On 3rd June a broken egg was found in the shelter and after about 10 days a check showed an incomplete nest in the nest-box as in the previous year. As the nest-box was on the large size we squeezed inside it a part of a disused thrush's nest and inside that was placed an old warbler's nest. On the 25th June two eggs had been laid in this improvised nest. Then followed normal incubation by, we think, the hen (the sexes are alike). Both eggs hatched on 8th or 9th July. We gave mealworms in addition to the usual food and the mealworms were seen to be fed by one of the parents perching on the ledge of the open front. It was easy to shut the parents in the shelter and check the nest and this we did every other day. The weather was very hot. We tried extra fruit such as diced pear. The mealworms taken were very few, perhaps 30 per day but much of the fruit was taken. We wondered if they were getting other live food such

as caterpillars as the aviary was on the fringe of our wood. Both young birds left the nest on the 20th July, the 12th or 13th day after hatching.

The fledglings were very attractive with dull black caps, white gapes, olive green mantles, and dark olive-green wings, and were creamy underneath. They were quite small with tails about 1 in. long. They perched in the privet and were able to fly short distances only. About 12 mealworms were taken that day but the next day over 50 mealworms went. We had gone through a very warm spell, temperatures being generally in the high seventies or low eighties F., and the inevitable thunderstorm broke on the late afternoon of the 22nd July. Searching in the aviary we found one young bird beaten to the ground and dead. We shut the survivor and its parents in the shelter. Next morning it seemed very fit and perched high and as the weather had now cleared up we let the three birds in the flight but shut them in the shelter for the next two nights. On the 25th July I didn't like the look of the young bird, it was very hunched and stayed in the shelter so we shut the parents in with it. It was not being fed so nothing could be done except to put it into a hospital cage and try to hand-feed it. However it died in a few hours and from the colour of its droppings it was apparant that it had enteritis.

The parents soon began nesting again, incubation commencing on the 3rd August and one chick hatching out on the 17th August. Another egg remained unhatched. Feeding was as before but three days later a dead chick was seen in the flight. The old nest-box was removed and replaced by a new and smaller one. The Bulbuls took to this at once, completing a small cup shaped nest, and were incubating two eggs by the end of the month. These hatched on the 12th September. Again the food was as before and the parents birds were both seen feeding. Again the chicks were thrown out, this time five days after hatching.

The male parent died the following April, but we managed to purchase another bird (sex unknown) later that year. This bird however, was crestless and its yellow colouring was paler. Early in 1970 I had the misfortune to break a bone in my right knee and this resulted in some stiffness in the joint and made it difficult for me to climb the staircase in our house so we decided to move to a bungalow in an area where the winters were milder and the summers not quite so hot. Later that summer we purchased a property in Cornwall close to the sea. Though we are much more exposed to winds and storms than we were at Newdigate, our avairies are all protected from South-Westerly winds by high screens of evergreens such as Escallonia, Eucalyptus etc.. We moved here in October 1970 with about 50 softbills and nectivores and with our best aviaries in sections! It took the next 12 months to erect and plant the 20 aviaries we now have, so 1971 was a blank year for any successful breedings. The old crested hen died in 1972, but we were fortunate in obtaining three more of the uncrested form, two from a dealer both freshly imported) and one from a Zoo (acclimatised). We now had the

possibility of two pairs but it was too late in the summer of 1972 to expect any nesting in the aviary we gave them. This has a flight 12 ft. long \times 3 ft. wide by 6 ft. 6 ins. high and a heated (45°F minimum) shelter 3 ft. \times 3 ft. \times 7 ft. 6 ins. high at one end. It is planted with a griselinia, a conifer and furthest from the shelter a *Lonicera nitida* and a *Senecio*.

Three of the birds spent the winter in this aviary and all seemed to agree, at least until the Spring. The fourth looked miserable and was caged in the birdroom. In the shelter was an open-fronted nest-box and a felt-lined canary nest-basket, in the flight an open-fronted nest-box. On the 24th April 1973 one of the three Bulbuls was seen in the nest basket and on checking this I found one egg. A second egg was laid the next day. Incubation continued until the 5th May when one egg was seen on the floor. The other egg was in the nest but punctured. The eggs measured 22 mm \times 15 mm. They were dark brown at the broad end with an off-white background flecked brown at the pointed end. By this time we had removed one of the three Bulbuls as it was being chased from the food pots. It was placed in a nearby aviary to join No. 4 which had overwintered in a cage. In late May one of the first pair was seen carrying dried grasses to the *Lonicera nitida* bush which was then about 4 ft. high and in which was built a very small cup-shaped nest entirely of dried grasses. Two eggs were laid and as the nest was entirely exposed to all the elements a sheet of clear corrugated plastic was fitted to the roof netting frame. Two chicks were hatched on the 14th June and the incubation period was either 13 or 14 days. We supplied the usual food plus about 50 mealworms most of which could have been eaten by the parents. All the mealworms were very lightly coated with vegetable cooking oil and as lightly dusted with Squibbs "Vionate" a mineral-vitamin supplement. Within three days we were feeding 100 mealworms a day. The weather was warm but unsettled on the 19th June when, with the parents in the shelter, I had a look in the nest. Both chicks were growing well and were heavily quilled. Another warm spell followed—where we live the shade temperature so far has not exceeded the low seventies F., but with the intense sunshine it always seems warmer than similar shade temperatures in Surrey. By the 23rd June, the 10th day after hatching, the chicks were almost fledged. Mealworm consumption had dropped from a high of 150 per day to about 100. Early on the 25th June, the 12th or 13th day after hatching, both fledglings left the nest. It was raining at 11 a.m. and as we were going out for the day, we shut the parents in the shelter, caught the young birds and put them in the shelter also. On our return in the evening they were on a low perch and from the droppings we were satisfied they were being fed. We kept the four birds in the shelter until the 29th June. At night all four would be on the topmost perch, the two young in the middle and one parent either side, a pretty sight! Other food was now being taken in addition to about 100 mealworms per day. The young birds differed

from those bred in 1967 from "crested" parents in that their underparts were whitish and not creamy-yellow. They could fly fairly strongly in and out of the shelter, but at night we shut the shelter door. They were by then invariably perched inside close together like peas in a pod. Observations over a period of an hour on the 3rd July showed that both parents were still feeding them mostly mealworms. From now on we rationed the mealworms so that they had none for four or five hours a day. This pushed up the consumption of the other foods. The white gapes were disappearing, the birds grew very fast and were almost as large as their parents by the 9th July. On the 16th July, the 22nd day after they had left the nest we shut the parents in the shelter and carefully caught the young birds and caged them some distance away. They were feeding themselves within two hours, eating all the soaked currants first. Though they were offered mealworms strangely enough they didn't touch them, and only after they were moved to an indoor aviary in the birdroom about two weeks later, did they sometimes steal one from a flycatcher sharing the same aviary.

The parents took the separation of their youngsters very badly, looked very miserable for some days and then moulted some of their tail feathers. We didn't expect that they would nest again this summer but by the middle of August the hen was incubating two eggs in a new nest about 18 ins. above the old one and in new growth. It was a few inches from the top of the shrub and even more exposed to the weather than the first nest. On the 30th August one chick hatched the other egg remaining unhatched. I removed this egg in about 10 days. All went well until the 12th September when the young bird should have left the nest. It seemed not quite fledged and slept a lot. We could see it through the netting from the path. Its breathing was very rapid and though the parent brooded the bird almost continuously, mealworm demand had dropped to very little and we formed the opinion the bird had been chilled on the nest during the night which had been cool. Two days later it was found in the flight dead. As I mentioned earlier, the nest is a very frail affair measuring about $3\frac{1}{2}$ ins. across, 2 ins. in total depth and less than $\frac{1}{2}$ in. thick. Its not lined, just coarse dried grasses. For success it seems it needs two chicks in the nest and warm days and nights such as we had in June and July. The two young birds which are independant have yet to moult but they have gradually become pale yellow underneath. The ruby or red throat is as yet absent though a deeper yellow than the underparts. The second adult "pair" have not nested.

As described above, the Black-crested Bulbul, *Pycnonotus melanicterus*, has been bred by Mrs. K. M. Scamell. It is believed this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Assistant Editor.

BREEDING THE RED AND YELLOW BARBET

(*Trachyphonus erythrocephalus*)

By M. D. ENGLAND (Neatishead, Norfolk, England)

The genus *Trachyphonus*, the so-called "ground barbets", is confined to Africa south of the Sahara and consists of five species—D'Arnaud's, Yellow-breasted, Red and Yellow, Levillant's and the Yellow-billed—the last of which is sufficiently different for it to be placed by some authorities in a genus of its own, *Trachylaemus*. The first three are birds of dry scrub areas and thorn savannas, while the last two prefer more wooded country.

The Red and Yellow Barbet lives up to its name and is a brightly-coloured bird clad mainly in red, yellow and black. The body is basically yellow, with black mantle and wings which are heavily spotted with white; it has red cheeks connected by a red band passing over the rear of the crown, a good deal of red on the upper breast and ventral areas, white cheek-spots and a tail which is barred black and white. The feathers of the crown are erectile. The male differs from the female in being generally brighter in colour and in having a black fore-crown and throat patches; both have a variable black and white breast-band. The species is locally resident from Somaliland and Kenya to north-eastern Tanzania; it is common in some parts of the Northern Frontier province of Kenya.

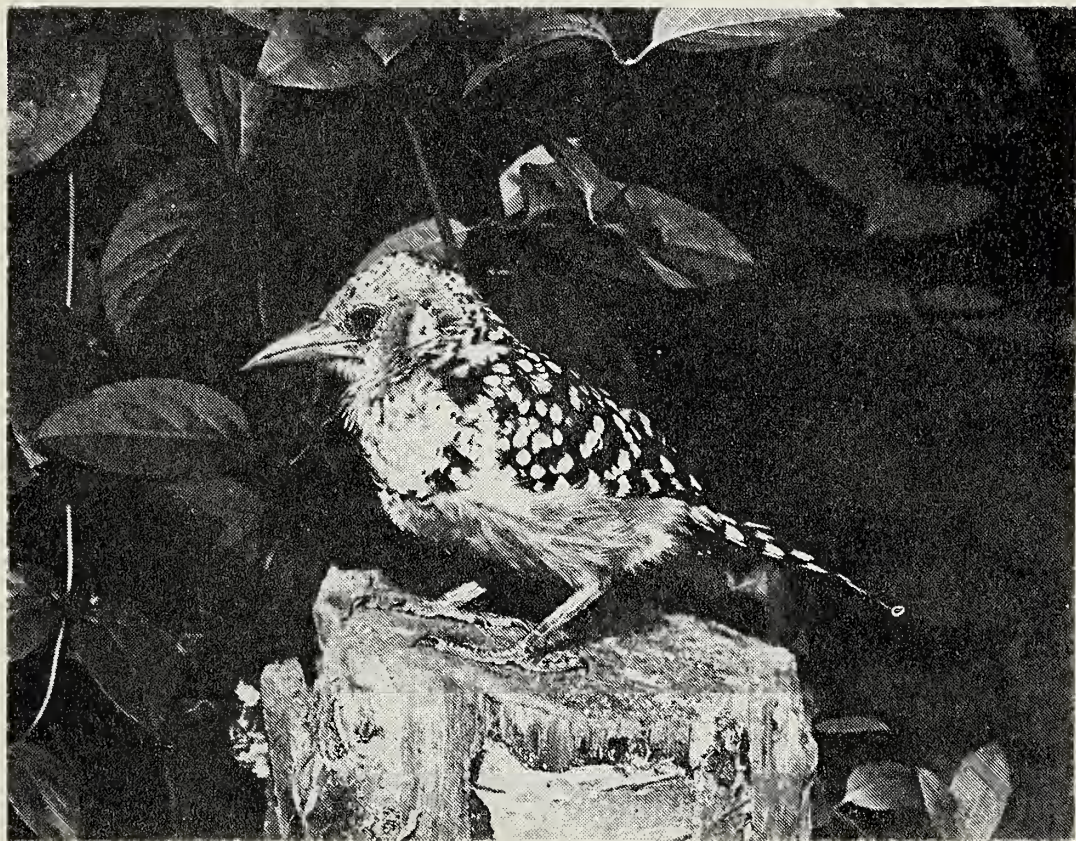
My Red and Yellow Barbets were sent to me from Kenya under licence by Tim Barnley and received at his hands the same meticulous attention and care in packing as he appears to give to all his birds, with the result that they arrived in perfect condition. They were placed in a section of birdroom about 6 ft × 5 ft. by 8 ft. high, with access to a 20 ft. flight. Because of very poor April weather they were kept inside for the first week or so, but seemed so fit that they were soon allowed into the flight. A nest-box 10 ins. × 10 ins. × 7 ins. was provided and they immediately took to roosting in it. From the start they returned to the shelter each night of their own accord and needed none of the wearisome chasing indoors which so many birds require. On the other hand they rarely go inside during the day except to feed, however bad the weather.

I have never known birds to thrive on so little food. They were offered mealworms, maggots, locusts, soft food, and fruit of many kinds, with occasional grated cheese and egg-yolk. At first everything was ignored except mealworms, but they settled down to a diet of a few of these, a fastidious peck at the soft food and diced fruit, with one or two maggots when they had finished their mealworms. Of course they are never denied food, but they appear to need incredibly little.

These birds are well-known as duettists, and almost immediately after arrival they started their interesting and amusing performance of sitting



Red and Yellow Barbet—male



Copyright]

Red and Yellow Barbet—female

[M. D. England

side by side, beaks slightly up-tilted, ecstatically "shouting" (this really is the only appropriate word) at each other an unmusical cackle. It is initiated by one bird but taken up at once by the other, *in different tempo*: while one is singing "titti-poo-too" the other keeps up "chock-er-chock-er". Most of the time they face each other, but as the paroxysm proceeds they rotate their heads to and fro, looking remarkably like the mechanical singing bird which provides the "signature tune" to the television programme "Going for a Song". This song is subject to considerable variation, since it is sometimes performed by a party of birds in chorus and the duet sung by one pair of birds may be very different from that of another pair. The song of my pair, for example, is quite unlike that of the pair which may be seen and heard in Alan Roots' magnificent film "The Baobab Tree".

They pose an avicultural problem since they are normally bank-nesters, boring a hole in earth or sand or termite-nest, like a kingfisher, and the particular aviary in which they were housed was quite unsuitable for the building of artificial banks such as are provided at, for example, "Winged World". As a substitute a bale of tightly compressed peat was set up with a tunnel and partially-excavated nest-chamber. To prevent the roof falling in, an upper lining of black plastazote was fitted. In case this was not to their liking, five different types of nest-box were hung in various positions; two were given a cursory inspection, but otherwise all were ignored.

Their song continued for the rest of the year and through the winter but in early spring was performed less and less enthusiastically and very infrequently. It was noticeable too that no longer did they perch side by side but one would sing in the flight and be answered by the other in the shelter. They seemed to be losing interest in each other and certainly showed no inclination to breed.

About mid-March the song ceased altogether, which made it all the more surprising to see, on the last day of March, the male pecking the female's head, then strutting in front of her, head and tail raised, and attempting to mate with her. However, it seemed to be a solitary effort and they settled down once more to ignoring each other, one sitting in the flight, the other remaining in the shelter.

On 7th April I was amazed to see the female leave one of the nest-boxes in the shelter, whereupon the male immediately flew up and took her place inside. He remained there for as long as it took me to feed the birds in all the sections of the bird-room and it was obvious that their apparent indifference was a cloak for serious nesting operations.

Both birds incubated the eggs, the male taking a major share during the daytime. Since I am not sure when it started, I do not know the length of the incubation time, but by 17th April the nest undoubtedly contained young because the parents were taking turns at carrying mealworms up. They were good parents, feeding the young at frequent intervals with

food carried in the bill. Mealworms were taken whole but mandibulated to soften them; small locusts had all legs removed and full-grown ones had their wings torn off before being given to the young. The method of doing this was interesting and similar to that adopted by hoopoes and some other birds; the locust was taken down to the ground, seized by the leg or wing and violently shaken until the body came off, sometimes being thrown right across the shelter with the effort. It would then be grasped by another leg or wing and the process repeated until the body was devoid of appendages, when it was held longitudinally in the bill and carried to the nest in that position. On the other hand, mealworms were held transversely.

By 7th April a youngster was looking out of the hole and two days later it was out, to be followed by the second (there were only two) in another couple of days. They were immediately sexable as male and female, being smaller and slightly paler editions of their parents, one having the male's characteristic black crown and throat marks.

Both parents continued to feed them well, at first on the ground and later when they perched. Curiously enough, although they ate them, the young were not very keen on the locusts which their parents always chose to offer them when they were available; the youngsters obviously preferred mealworms to everything else. The first out did very well for a week, when it began to decline and eventually succumbed at five or six weeks old. The young male rapidly became self-supporting and had to be removed to another aviary when his parents showed signs of starting another nest.

To make the record more complete it should be added that, prior to their second brood, a great deal more courtship was seen. The male frequently fed his mate, sometimes stealing a locust which she was preparing to eat in order to offer it to her. There was much head-pecking as they perched side by side, although again their duetting ceased. Mating was seen twice with little preliminary while perched, but the male usually prefaced an attempt at coition by strutting round the female on the ground, tail cocked up, with increasingly frenzied head-pecking until as she crouched low *he stood astride her, feet on the ground*, until he actually mounted and grasped her as the act was completed. He looked comically like a tall man whose feet reached the ground while riding a small pony.

REFERENCE

ARMSTRONG, E. A., 1963. A study of Bird Song. O.U.P.

As described above, M. D. England has bred the Red and Yellow Barbet, *Trachyphonus erythrocephalus*. It is believed this may be a first success.

Any member or reader knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to communicate at once with the Assistant Editor.

THE DWARF (RED) TURTLE DOVE

(*Streptopelia tranquebarica*)

By S. B. KENDALL (Chertsey, Surrey, England)

As its English names suggest, *Streptopelia tranquebarica* is a member of the large group of "ring-necked" doves of which the domesticated Barbary *Streptopelia roseogrisea* and Collared dove, *Streptopelia decaocta*, are well known examples. It is however much smaller than either of these, being only about nine inches long and is probably unique in the group in having a well-marked colour difference between cock and hen.

Cocks have an ash-grey head down to a black collar round the hind neck. The rest of the upper plumage is wine-red except for a dark grey patch at the base of the tail. Wings and central tail feathers are brownish but the three outer pairs of tail feathers are black at the base and white at the ends. The lower parts are mainly wine-red. Hens are brown-grey with a black collar similar to that of the cock. Young when they leave the nest are uniformly brown without a black collar but this soon starts to appear. Cocks moult into red plumage in the autumn or winter of the year in which they are hatched, i.e. the first moult, the exact time depending on whether they are early or late hatched. If young cocks are examined in early autumn a few red feathers may be apparent.

According to Whistler (1941) the bird has a wide distribution throughout Asia and parts of China to the Philippines and there are three recognized races of which the one from Assam and Burma is most richly coloured. My original stock probably came from India but more recently I bought a pair in which the hen was distinctly darker. The cock with which she arrived was certainly of excellent colour but this does vary between individuals and according to age in my home-bred birds. However these may well have been the Burmese race.

The Red Turtle Dove has been known to Aviculture for a good many years and a Miss Rosie Alderson (1913) who was an enthusiastic and successful dove-keeper wrote a laudatory account of "this beautiful little dove, very small, trim and graceful in shape" in the AVICULTURAL MAGAZINE, the articles being later reprinted in a volume called *Practical Bird-keeping* which was edited by J. Lewis Bonhote. Miss Alderson refers to the birds nesting freely but not always rearing. I have not traced the reference but I believe that elsewhere she does report successful rearing. There are probably earlier references.

I have now kept the Red Dove for about 13 years, breeding successfully nearly every year and now having a well-established stock. Some account of the birds' activities may be of interest to fellow Members of the Society.

I have never seen the species in the wild but Whistler (*loc. cit.*) gives a useful account from which it appears that it is less conspicuous than the

other common doves of India occurring usually in single pairs, away from villages but in all sorts of country except extreme desert and heavy forest. Occasionally large flocks occur and these may consist of all males.

Importation into Britain is sporadic. I remember seeing what were described as "Burmese Red Doves" advertised in *Cage-Birds* soon after the war when importation was just being resumed and I was thinking about resuming bird-keeping, but it was not till later that I bought four pairs (probably from India) as a breeding nucleus. There were the usual troubles with imported birds. All four cocks died from ornithosis, one hen succumbed to some other cause and as no more imports appeared I was left for a year or two with three widows. However I was eventually able to exchange one hen for a cock and to buy another. These birds provided the nucleus for a stock which, while fluctuating widely over the years, has with one infusion of fresh blood survived to the present day.

As has been indicated the species has the outstanding merit of being readily sexed on colour. Old hens tend to look pinker than is typical, particularly on the breast, and some cocks are less red than others but the distinction is usually very clear. In captivity flocks of mixed sex can be kept together outside the breeding season but when breeding, as with most doves and indeed with most birds, they do best as isolated pairs. I have had limited breeding success with a small flock (three or four hens with rather more cocks) in a shed and attached flight with a total floor area of about twenty-four square metres but the occasional bird is liable to be persecuted. In a confined space unacceptable persecution may take place. I have recently had two pairs breeding very successfully in a total floor space of ten square metres but one pair established territory outside and the other inside the shelter. There was no evidence of persistent fighting. Young birds were tolerated, but were removed within two or three weeks of leaving the nest.

Red Doves build for preference in an open site although I have had them nest in a covered box. The nest is initially of the classic dove type—two crossed sticks on which the eggs are balanced. I usually try to persuade them to nest on a piece of half-inch wire mesh or to replace the nest they build with one of netting. With luck, however, the birds nest more than once and the nest may be used again and become more substantial as the season progresses, partly as the result of the accumulation of droppings.

The normal clutch is two eggs. Whistler (*loc. cit.*) says that three may occur. I once fostered a spare egg to make a clutch of three all of which hatched, but one young bird died after a few days. Young doves normally orientate themselves in the nest in head-to-tail fashion and when three were present there were clearly complications, and, it seemed to me, unusual activity while they tried to arrange themselves suitably. Barbary Doves are capable of hatching and rearing Red Doves in spite of the latter being so much smaller, but in my limited experience there is a high

percentage of failure.

The incubation period is about thirteen days and the young grow very rapidly; particularly, so it appears, for the first week. At about ten days there is a tendency for babies to hop out of the nest. This should be avoided if possible by leaving them strictly alone. If a bird should leave at this stage, or even wander a little from the nest platform it will probably not be brooded and will die unless put back. Brooding is shared between cock and hen in usual pigeon fashion, the hen taking the night shift. Young leave the nest at about fifteen days after hatching and are self-supporting soon afterwards. My records on this are not exact. Birds do not interfere with rings put on after fledging.

A pair that starts breeding in May, which seems to be the norm in southern England may well rear three broods in the season but there are of course plenty of opportunities for accidents. Birds live and continue breeding for a number of years and a three or four year old hen is probably a better breeding proposition than a first year one.

My birds have unheated sheds to roost in and appear to be completely winter-hardy. Feeding is easy. They seem to accept most grains up to the size of the components of "mixed chicken corn" *i.e.* a mixture of wheat, cracked maize, oats and barley, the two former being much preferred. A commercial "canary mixture" is much enjoyed. Clearly cereal mixtures may prove inadequate for breeding although doves seem less susceptible to the deleterious effects of low protein than some species. I feed turkey starter crumbs with the cereal mixture and sometimes bread and milk and hard boiled egg but it is difficult to say how much they take.

To me *S. tranquebarica* is a very delightful bird and a very satisfactory aviary subject. A drawback, which has been more apparent to others who have kept the species than to myself is its typical dove-like tendency to panic when disturbed. Birds in a confined space may fly directly at the disturber and escapes can occur. In a larger area they may hit the end of the flight uncomfortably hard and damaged heads and wings result. However, if treated gently in quarters to which they are accustomed their nervousness can be overcome.

The need to establish in captivity and regularly to breed foreign birds in order to avoid dependence on continual importation is a fashionable doctrine with unfortunately more advocates than exponents.

The Red Dove seems to be a very suitable subject for ultimate domestication.

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SCRATCHING AND PREENING POSTURES IN HUMMINGBIRDS

By A. J. MOBBS (Walsall, Staffordshire, England)

Although I am unaware of any hummingbird species which indulge in mutual preening, after studying these birds for a number of years, I have learnt it is unwise to generalize with this family, as the Trochilidae are so diverse, there is almost sure to be a species which will prove any generalization to be incorrect.

It is safe to assume the majority of hummingbirds do not indulge in mutual preening, and because of this have evolved highly developed scratching and preening postures. To the casual observer, the minute legs and feet (of most species) would appear to be of little use other than for gripping a perch. However, if one is prepared to study these birds more closely, it will be seen how well adapted for preening the feet have become.

As with most birds which do not (or are unable due to being housed alone) indulge in mutual preening, the hummingbirds preen the head, neck, chin and upper throat with their claws. Long billed species preen certain other parts of the body also in this way.

The Swordbilled Hummingbird (*Ensifera ensifera*), due to the extreme length of beak, is unable to reach any part of its anatomy other than the wings and tail, and even these feathers can only be run through the centre of the beak as a whole, not individually as with other hummingbirds. Because of the length of beak and the problems entailed, the legs and feet of the Swordbilled have extra manoeuvrability, thus enabling the species to preen areas it could not otherwise reach.

It is quite an experience to watch a Swordbilled bathe and preen and the first time I witnessed such an occurrence, I was amazed as to how well the bird's legs and feet are adapted for such work. As far as I am aware, no other species of hummingbird is able to preen the centre of the back or vent feathers with its claws as the Swordbilled does.

A friend informed me that a Swordbilled owned by him was seen to preen the primaries also with its claws. Certain hermits (*Phaethornis* and *Glaucis*) will preen their wing coverts with their claws, but I have yet to witness a hummingbird preening its primaries in this way.

Several other species, due to the length of beak, have to use their claws a great deal. Many of the hermits (both *Phaethornis* and *Glaucis*) can be seen to scratch-preen regularly; in fact, a female Long-tailed Hermit (*P. superciliosus*) in my collection often scratch-preens areas which can be reached just as easily with the beak.

It is often stated that in common with most other birds, the hummingbirds bring the foot up and over the wing when scratching. As with most

generalizations appertaining to this family, this one is incorrect. I will agree it is more usual for most hummingbirds species to bring the foot up and over the wing. However in many long-billed species the foot is brought up and under as often as it is brought up and over.

Due to the way in which they are constructed, many hummingbirds assume most exaggerated preening postures. The neck appears to be exceptionally flexible and when certain species preen the wing butts or the upper (and lower, according to the length of beak) breast, the neck may be stretched to three or four times its usual length. The neck is also stretched during certain scratching postures and I have a number of most amusing colour transparencies showing a female Blue-fronted Lancebill (*Doryfera johannae*), with the neck stretched out of all proportion while scratch-preening the lower hind neck.

I have mentioned the unique way in which the Swordbilled Hummingbird preens. Another species which has an extremely specialized beak is the Sickbill (*Eutoxeres*). This species, however, appears to find little difficulty when preening, in fact the beak proves to be an ideal tool for such work, and it is only the head, hind neck, chin and upper throat which has to be scratch-preened. Due to the extreme curvature of the beak, the Sickbill does not have to assume exaggerated postures when preening the lower throat and upper breast.

I believe it is possible to place certain scratching and preening attitudes into categories. First there is the posture taken up by a hummingbird which is scratching due to irritation. Under these circumstances the actions although deliberate are usually rapid, the foot being moved extremely quickly. If the irritation is about the head, the bird will while scratching move the head into different positions, thus enabling a larger area to be covered with the minimum of effort. I have noticed that this form of scratching is quickly over and it appears once the irritation has eased, the bird will cease to scratch.

When scratch-preening, the foot is moved in a more leisurely manner and the bird gives the impression of actually combing the feathers with the claws. Also during scratch-preening the bird's body will often move in unison with the action of the foot; especially when it is the neck feathers which are being preened. It is a most amusing sight to see a number of hummers sitting on the same perch all scratch-preening, as if the perch is a supple one, the movement of the birds sets it in motion until eventually such a momentum is reached, the birds find difficulty gripping the perch.

Scratching and scratch-preening is often carried out on the wing and certain hummingbird species appear to prefer to scratch and/or preen while on the wing rather than when perched, even though such an activity appears extremely difficult to human eyes. With irritation scratching, it is usually the head or beak which is attended to, and a male White-bellied Woodstar (*Acestrura mulsani*) in my collection, will purposely leave the perch to scratch its head and/or beak.

When scratch-preening on the wing, it is usually the breast or abdomen which is attended to, although I have on occasions witnessed hummingbirds scratch-preening the hind neck also. To do this, the foot is usually brought up and over the wing; no mean feat when the bird remains airborne the whole time.

Finally I would like to mention displacement preening in hummingbirds. This occurs when a bird has experienced stress for some reason, and is most prevalent directly after fighting has occurred. It can also occur directly after a bird has been forced to leave a favourite perch—either by another bird or by a human. I have also witnessed displacement preening by a bird which has acted in a way which in human terms would be considered foolish: i.e. miscalculated when alighting on a perch.

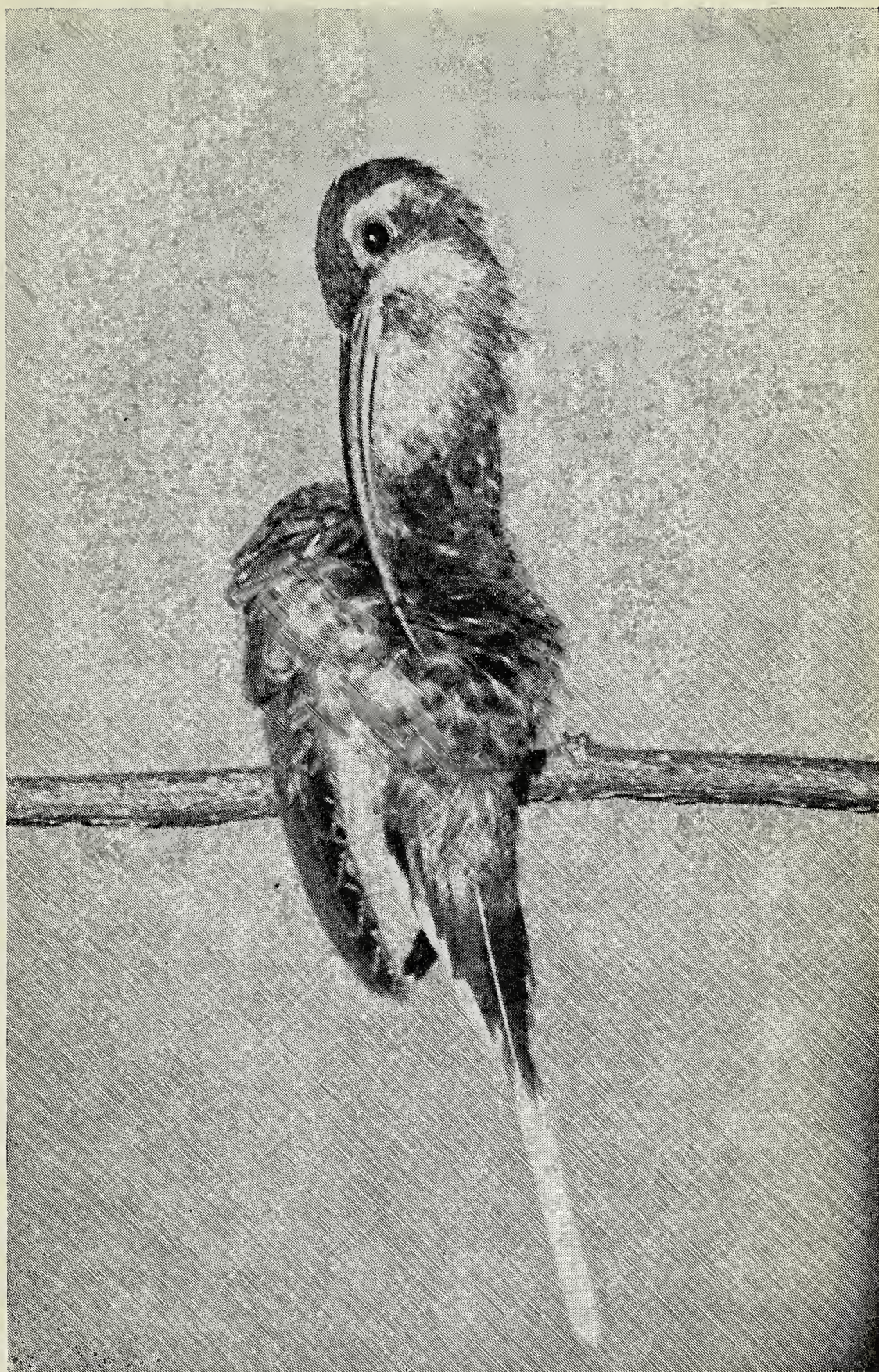
Displacement preening appears to be carried out by the claws (even in short-billed species), and as with irritation scratching, is carried out in a rapid manner. However, an aviculturist who has witnessed this activity a number of times should be able to distinguish it from irritation scratching or scratch-preening as the bird's movements will be more jerky and the head in particular will be moved more sharply.

I have witnessed displacement activity in certain species yet rarely if ever in others. Pufflegged (*Eriocnemis*) and Sunangels (*Helianthus*) appear to indulge in this activity more than most, probably because of their extremely aggressive nature. The Rufous-breasted Hermit (*G. hirsuta*), also reverts to this activity regularly.

It appears as well as certain species indulging in displacement preening more than others, individuals from these species may acquire mannerisms peculiar to themselves, but not necessarily to the species as a whole. For example the male Rufous-breasted Hermit in my collection scratches the lower hind neck—usually after showing aggression to other species with which it is housed. When perched this hermit brings the foot up and over the wing or up and under, but when the displacement scratching is carried out on the wing (which is often) the foot is always brought up and under.

The male Tourmaline Sunangel (*H. exortis*) in my collection, also scratches the lower hind neck; this bird always brings the foot up and over the wing. The Sapphire-vented Puffleg (*E. luciani*), although not as consistent as the two previously mentioned species, does scratch the hind neck, but will also scratch the crown during displacement activity.

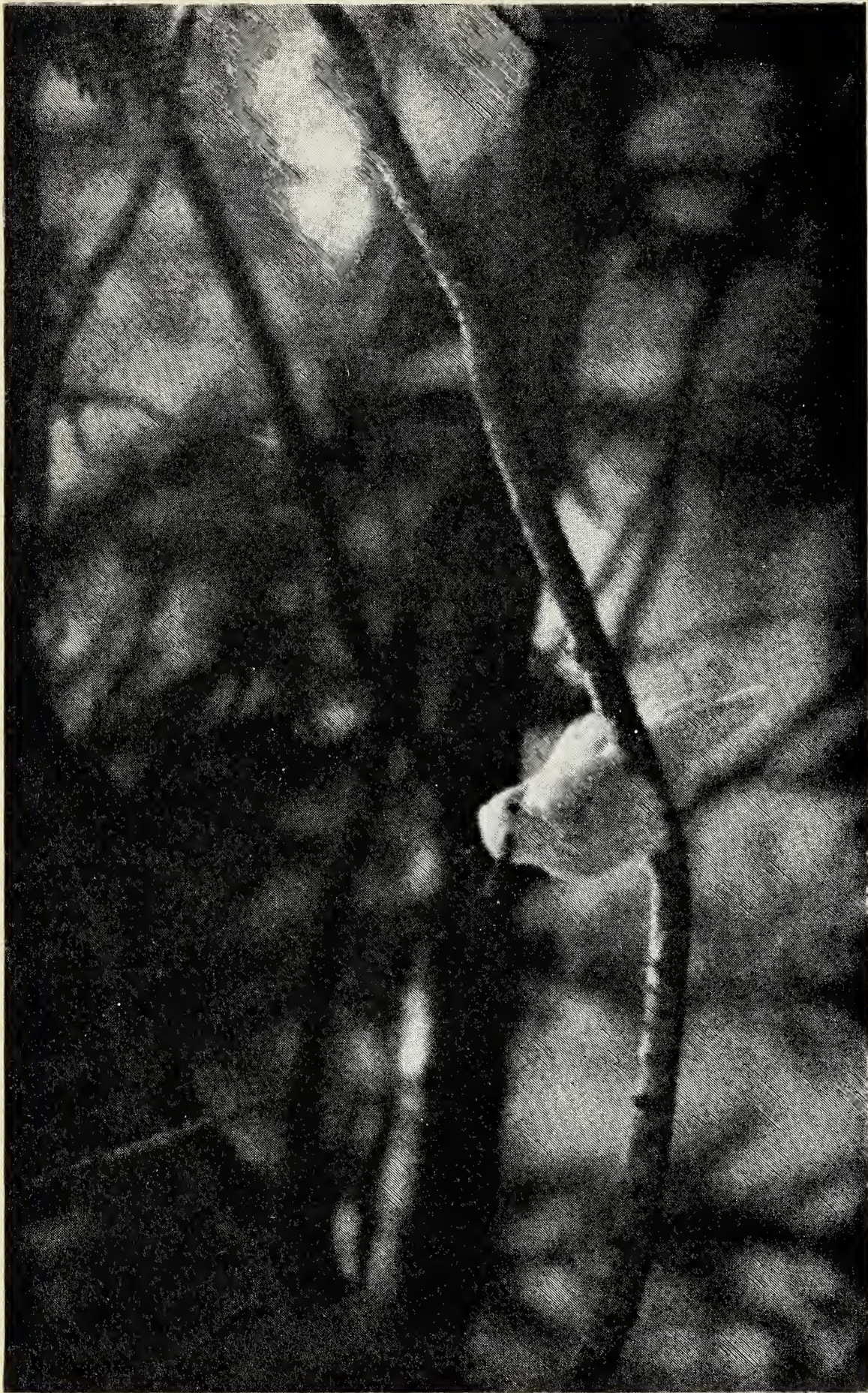
Displacement scratching and/or preening is known in many other families of birds and I have witnessed the activity in numerous parrot-like species, also in domestic pigeons.



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[A. J. Mobbs

Female Long-tailed Hermit Hummingbird (*Phaethornis superciliosus*) preening. The area being preened with the beak is also preened as readily with the claws.



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Albino Black-chinned Hummingbird

[Russell Buchan

OBSERVATIONS ON AN ALBINO BLACK-CHINNED HUMMINGBIRD

By KARL-L. SCHUCHMANN (Zoologisches Institut, Frankfurt, Germany)

During a research study at San Pedro, California, on certain ethological aspects of North American Hummingbirds, I was, with the assistance of S. Wells and G. Nixon, able to trap a young albino Black-chinned Hummingbird, *Archilochus alexandri*.

During the early part of July 1972, approximately 15 female *A. alexandri*, were seen to be brooding, or showing signs of nesting, in the restricted area of Averill Park, San Pedro. The nesting sites were close to a small lake and many of the nests were directly above the water. The breeding birds preferred the shrubs of *Senecio petasites*—a plant belonging to the sunflower family—and lower parts of certain willow species.

I first saw the albino Black-chinned in the lower part of an elm tree at a height of about three metres. I had been informed by other observers that the bird had left the nest three days before. Up to this date, the mother bird had fed the young albino regularly every ten minutes or so.

There had been two youngsters—the other being a normal coloured bird—but 24 hours after leaving the nest, this bird was not seen again.

As well as feeding the young albino, the mother hummingbird collected nesting material (hair, spiders' webs and for the external decoration dead cactus cells), and proceeded to build a second nest in an elm some two metres from the previous nest, in which the albino had been raised.

The female Black-chinned laid her first egg the same day as the second nest was completed; two days later, the second egg was laid. By this time the young albino had left the nest six days.

The albino had remained in the same elm since leaving the nest. As the mother bird was now sitting, she was unable to feed the young bird regularly and because of this, the latter was heard to call for food more persistently. The call was made up of a high pitched *ziip*. Sometimes the call would be answered by the mother bird and she would then leave the nest and feed the youngster. However, it was noticeable that as time progressed, the begging behaviour of the young albino became less successful.

Other hummingbirds (mainly immature *A. alexandri* and *Selasphorus s. sasin*) were seen to attack the young albino; these attacks were usually warded off by the mother bird.

Seven days after leaving the nest, the albino was caught with a butterfly net. Permission for this was granted by the United States Department of the Interior Wildlife Service.

From the time of fledging, the albino had been most lethargic and was not seen to inspect leaves or flower buds; an activity observed in other hummingbirds of the same age. Before the bird was collected, it was

noted that the mother bird fed it once only (and then only for a second or so), during a three hour period.

Two days after being collected, the albino died.

Description:

Bill: 1.82 cm (from n.c.) Base deep flesh coloured, less intensive towards the tip.

Iris: Deep red.

Plumage: White.

Extremity: Flesh coloured to red.

Weight: Seven days after leaving the nest (total age 23–25 days):
3.19 g.

Wing length: 4.30 cm.

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SCHUCHMANN, K.-L 1973. Albinismus bei Kolibris, *Die Gefiederte Welt*, 97–13.

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BREEDING THE RED-NECKED FRANCOLIN, *Pternistes afer*, AT THE JERSEY WILDLIFE PRESERVATION TRUST

By D. GRENVILLE ROLES

(Deputy Curator of Birds, Jersey, Channel Islands)

Distributed in various subspecies over the southern third of Africa, our three specimens (♂♀) came from the vicinity of Luanda in Angola on the 20th May 1971. They appear to be the nominate form *Pternistes a. afer*, Muller 1776.

Description

About the size of a Partridge with the spurred male being noticeably larger than the female, they have the forehead, eyebrow and moustachial stripe white, top of the head brown, neck speckled black and white and the remainder of the upper parts earth-brown with darker shaft stripes. Underparts are broadly streaked with black and white (black shaft stripes with white edges) legs, bill, facial skin and throat wattle coral red. The sound most commonly heard from our birds is a loud "crowing cackle", on a descending scale, usually heard early morning and late afternoon. They are reputed to make "Kek Kek Kek" call in flight, and give their alarm call when perched in trees.

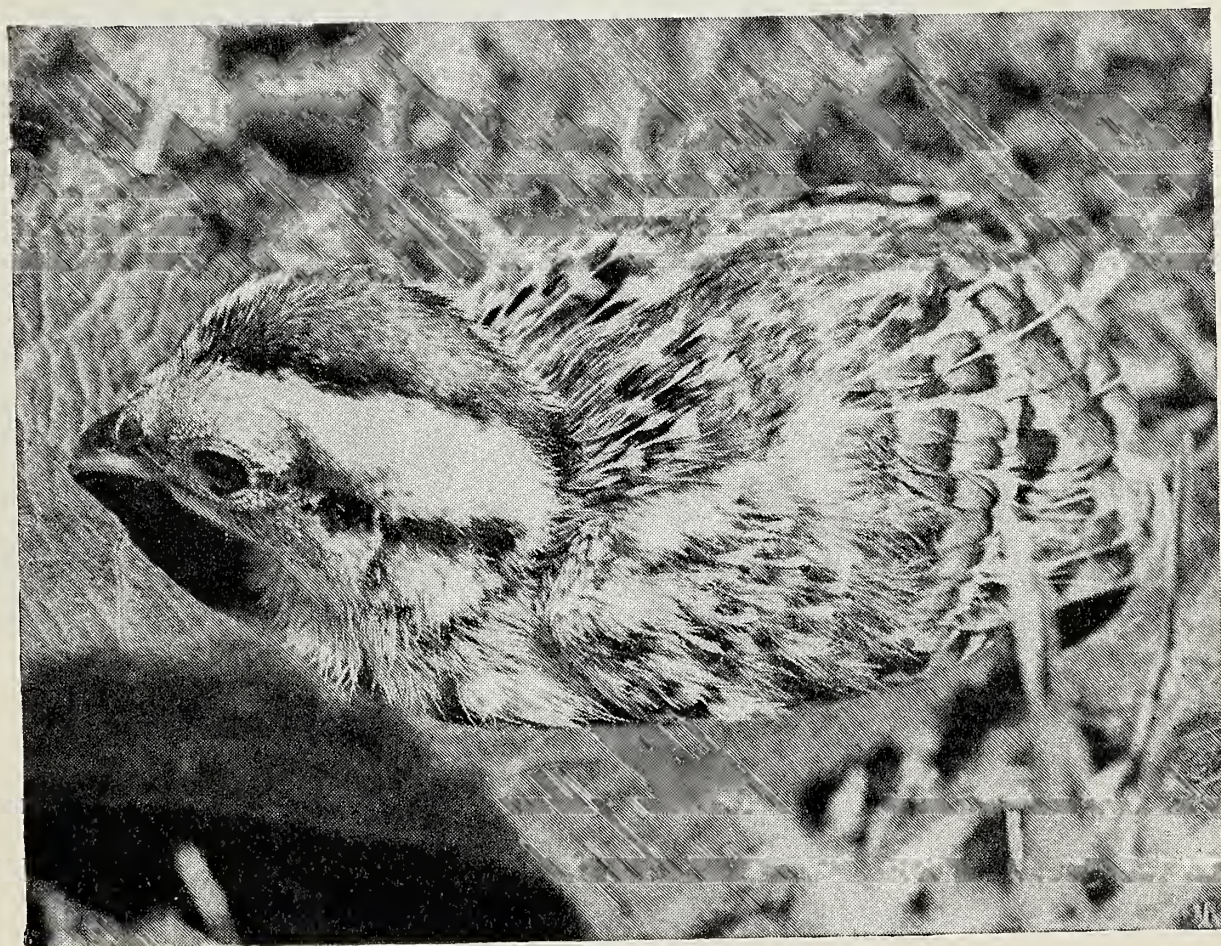
Accommodation and Diet

After quarantine the birds were released into a small aviary approximately 4 ft. × 10 ft. × 7 ft. high, with a shelter 3 ft. deep at the rear. The



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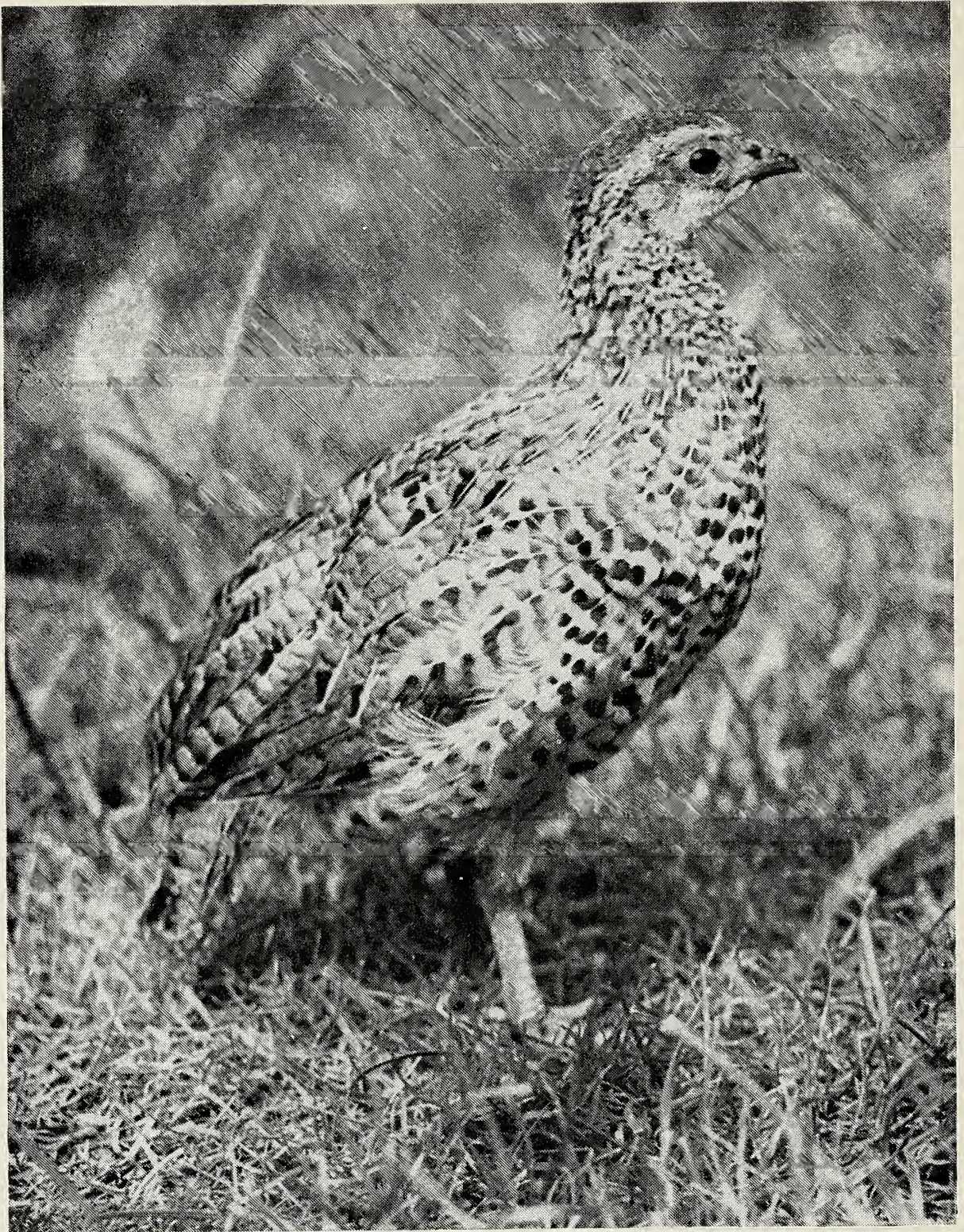
Red-necked Francolin. Age when photographed 1 day. [Phillip F. Coffey



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Red-necked Francolin. Age 12 days.

[Phillip F. Coffey



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[Phillip F. Coffey

Red-necked Francolin. Age 2 months 6 days.

floor is covered with a deep layer of sand and planted out with *Lonicera nitida* and *Ribes sanguineum*. A rear corner was made private with grass tussocks and clumps of dried bamboo leaves. It was in this corner that a scrape was made and all the eggs were laid. The birds had a constant supply of layers pellets and mixed canary seed. In addition, they received between 20 and 30 mealworms daily and a regular supply of fresh turves which they enjoyed shredding.

Behaviour and Breeding

For convenience the birds were kept as a trio, though almost certainly only one hen was mated with, and certainly only one was favoured, being called to mealworms and other choice titbits by the male. If the other female approached she was given a sharp peck and swiftly chased away, although not pursued. The greater part of their day seemed to be spent skulking amongst the small shrubs of their aviary, the male being particularly lethargic. Great interest was taken in the fresh turves which they regularly received, the presence of the odd female being tolerated at the investigation. Dust-bathing was also taken part in regularly and vigorously, the birds resting periodically during their exertions. The only form of courtship observed was after the supply of mealworms or turves, when the male called to the female with his neck stretched up and forward, all plumage apart from the flank feathers which were fluffed out was sleeked, and he adopted a peculiar high stepping gait around the apparently disinterested, feeding female. The stretched neck of course showed off the naked red throat patch very clearly and the stripes of the underparts were shown to advantage by the upward stretching of the bird. Mating was never observed. The first egg was laid on the 25th January 1972, eight months after the birds' arrival; this, however, was broken.

The first clutch of five eggs was started on the 19th March 1972, eggs being laid on alternate days. A sixth egg was laid on the 4th April. Of these two were infertile and four were dead in shell. The size of the eggs varied from 31–34 × 38–40 mm and possessed remarkably thick shells. They were a uniform light brown colour and heavily pitted—each pit showing as a white speckle. Egg production started again on the 7th December 1972 continuing very erratically throughout the first four months of 1973. Forty-four eggs in all were produced of which four only hatched on the 21st May after an incubation period of 23 days. Of the remainder six were dead in shell, three were broken and the others were infertile.

Chick Development

On hatching the chicks' down pattern was as follows: a mid-brown stripe bordered by darker brown extended over the crown to the nape. The back was mid-brown bordered by darker brown next to a buff stripe, a dark stripe separating this from the buff undersides. The face and

neck were a yellow buff—with a darker brown stripe leading from the eye to fork behind the ear. The thighs and wings were speckled and striped. The legs were orange pink and the eyes brown. The bill was a dark horn colour with a darker stripe over the culmen and a dark spot in front of each nostril. The egg tooth was yellow. The initial rearing diet consisted of chick crumbs, mixed boiled egg, bread and milk and “Saval” puppy food.

- 2 days—Well developed pin feathers on wings just starting to open.
- 4 days—Flights opening up a light buff colour, not yet capable of flight—underparts darkening. Boiled egg and bread and milk discontinued.
- 6 days—Bare patch behind eye first noticed. Bill darkening, flights developing—mottled area now visible. Not yet capable of flight. One chick died, no apparent cause.
- 8 days—Flights now reach to end of body. Tail feathers now noticeable. Pin feathers opening up on upper back and shoulders. Bill darkening, legs darker, egg tooth shed.
- 10 days—Capable of flight, primaries extend beyond tail length.
- 13 days—Feather tracks on side of body from neck to rump in pin-feathers—opening on side of neck in black and white spots.
- 15 days—Speckled plumage on sides of body continues to develop.
- 18 days—Bald patch behind the ear enlarging, plumage developing on thighs. Bill completely dark apart from light tip.
- 23 days—Head still unfeathered. Stripe from throat to tail covered with down only. Wing coverts almost fully developed. Ear coverts developed. “Saval” puppy food discontinued.
- 39 days—One chick persecuted by the other two, its back was raw and bloody. Chicks separated. Head feathers appearing, facial skin becoming reddish in front of eyes.
- 45 days—The chicks now look like large Quail. Undersides are light grey spotted with black. Upperparts are a mottled sandy brown. Bill black, face pink above whitish cheek stripe. Legs reddish.
- 99 days—Francolin attacked and mutilated a female Sandgrouse, causing eventual death.
- 106 days—Upperparts earth brown with darker shaft stripes over upperback and wing coverts. Naked patch on throat starting to develop. Bill still black. Striping starting to appear on upper breast.
- 130 days—Facial skin orange-red. Culmen dark and reddish sides to bill small throat patch orange red. Neck speckled. Underparts striped and spotted. Almost the size of the adult females.

SUMMARY

The breeding and rearing of Red-Necked Francolin is described with a total of two chicks being reared. This is the second species of Francolin to be bred by the Jersey Wildlife Preservation Trust. The first being the Red-billed Francolin *Francolinus adspersus* which was bred for the first time in September 1963.

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OBSERVATIONS ON THE BEHAVIOUR AND
BREEDING OF THE SAFFRON FINCH*(Sicalis flaveola)*

By C. J. O. HARRISON (Berkhamsted, Herts, England)

In the early spring of 1973 I received three South American birds of the genus *Sicalis* from Robin Restall in Spain. From their behaviour I suspected that they were two males and a female but there was some doubt about their specific identity. An examination of museum skins showed that they must be Saffron Finches, *Sicalis luteola*. This species had been bred fairly frequently in captivity but, like many other South American species, its behaviour and life-history are very poorly documented and the present account seemed justified.

PLUMAGE

The adults of the species are distinctive enough. The male is green above with faint darker streaking on the lower back and dark inner webs on tail and wing feathers; yellow on head and underside; with saffron-orange on lores, forehead and forecrown forming a distinctive patch. The amount of green tint in the yellow on the underside, head and mantle seems to vary with age. The male described here, newly moulted from immature plumage, showed a distinct green tint over much of this plumage.

The female is olive-green dorsally, with dark streaking on mantle and back, and small fine streaks over the head. Wings and tail are dark with of greenish-yellow feather edges. Lores, throat and underside are yellow and the area around the eye is an unmarked yellowish-green. There may be a faint orange tint on the forehead.

The identification problem arose because the birds sent, although behaving like adults, were in immature plumage. This is greyish-white on throat and underside, save for the upper breast which has a broad band greenish-yellow, the latter continuing as a narrow strip across the upper mantle. The head is grey, slightly tinted buff and with fine dark streaking over the top and nape. The mantle and back are streaked dark brown and tinted yellowish-green, deepest on the rump. Wings and tail are

dark, edged with greenish-yellow like those of the female. The under tail coverts are yellow. The bill of adults is a light buff colour. In the young it is blackish at first, but the lower mandible becomes pale, and is conspicuous in "bill-up" displays.,

In this plumage the birds were singing advertisement song and quarrelling, and one received like this was still in immature plumage six months later. The period for which this plumage is retained, and its relationship to the breeding cycle does not seem to have been investigated.

GENERAL BEHAVIOUR

The Saffron Finch is a typical seed-eating bunting, appearing rather heavily-built and short-necked, and having a short blunt bill. It perches when resting but feeds extensively on the ground, walking with a steady, lark-like stride, and occasionally running. On a perch it will sidle rather than hop. It can cling to a vertical perch and lean out to reach seed-heads. It is capable of making brief, flycatcher-like flights from a perch after small flies. It bathes avidly.

Saffron Finches are aggressive and quarrelsome, both among themselves and with other birds, tending to dominate those placed in aviaries with them. This makes them difficult for mixed aviaries and this, together with their loud and rather monotonous song, probably prejudices aviculturists against them.

FOOD

I can say little concerning food, since the birds were housed with some Painted Quail and for much of the time also with a pair of Spanish Sparrows also present. An aviary seed mixture was offered and maggots and grated cheese were also put into the aviary. The last two regularly disappeared but I could not be sure if the Saffron Finches took any. They certainly took unripe seeds of grasses and herbaceous plants, and small insects, especially when there were young in the nest, but were not seen to take maggots or mealworms until the young of later broods were in the nest.

VOICE

The normal flight call is a "chep" note, sparrow-like but a little more melodious. Birds settling near each other may squabble with a harsher "chuc-chuc-chuc" chattering note, usually accompanied to some extent by the "bill-up" display. A subdued "hueet" call was heard at times from the male, usually when the female was on the nest, and from its context it appeared to indicate slight anxiety. The alarm call, frequently heard, is a short, high-pitched and thin "stít".

Advertisement song is usually uttered from a high and conspicuous song-perch. Although in brief moments of song during other activities only four or five notes may be uttered in a phrase, during more sustained

outbursts the phrases consists of eight to twenty notes. The notes resemble the high-pitched calls made by House Sparrows during their more excited moments when fighting, but are a little more melodious. In a typical phrase the first four to seven notes are loud, sharp and incisive, and are uttered separately as a series of independent notes with apparently random variation in pitch. The remainder of the phrase is similar but the notes are more hurried, less sharp, and sometimes two or three are run together. As a song it is monotonous and the cumulative effect is not melodious.

There are usually periods of sustained song, one long phrase following another in rapid succession, after dawn and just before sunset. The early morning song period may be very long. The period at dusk may be shorter, about ten minutes or a quarter of an hour, but is of very regular occurrence, even in cold and wet weather. During the breeding period there are intermittent outbursts at other times of day and short phrases may occur at any time.

In addition the male also has a subdued song. This is a quieter, sustained warbling of a much more musical type. It is uttered as a continuous flow of soft and melodious but slightly wheezy notes, and may include intermittent low, grating notes. It appears usually to be sung in the presence of the female, and on the only occasion on which an apparent courtship display occurred it was accompanied by this song.

The call of young in the nest is a soft wheezy "tzee-tzee"; and on their emergence this changes to a loud "zwit, zwit-it", harsh, nasal and of moderate pitch, lower than the call of the nestlings.

POSTURES AND DISPLAYS

In general the green and yellow colouring of the adult birds is less conspicuous than might be expected, but the orange forehead of the male appears to have a strong signal function. During advertisement song the head is frequently moved from side to side and up and down as the disjointed notes are uttered, and the frequent sharp movement of this small patch of colour is conspicuous from a distance.

A possible epigamic display was witnessed only once and not clearly seen. The male was feeding on the ground near the female. A more vigorous burst of the subdued song was heard and the male was briefly glimpsed running towards the female, rather upright, the feathers of head and neck appearing fluffed so that the orange and yellow colour was very conspicuous. The wings appeared to be drooped and the tail cocked sharply upwards.

The aggressive nature of this species has already been mentioned. Reaction to other species such as the sparrows was a simple forward threat with open bill. Towards conspecifics the "bill-up" threat posture was frequently used. One bird would settle near another, in a rather upright posture either facing the other bird or laterally aligned to it, and

throw back the head with a quick movement so that the bill pointed straight upwards. Both birds may adopt this posture and one may make a threatening move towards the other, but in general dominance appears to be established without open conflict.

In the male the colouring of the forepart of the head which moves most conspicuously during this display is yellow, with the orange forehead region. In the female throat, lores and around the eyes are unmarked yellow. In the young the throat is white, and the pale buffish lower mandible is more conspicuous during the movement.

BREEDING

When received, in late February, the birds were put into an aviary consisting of a part of a greenhouse 2 ft. 6 in. \times 4 ft. \times 7 ft. high, set in the angle of a wall with the top partly shaded, and opening through a large aperture into a planted flight on a slope, about 13 ft. \times 3 ft. and tapering in height from 8 ft. to 5 ft. Two birds were in immature plumage and the female had mostly moulted into first adult plumage. It was thought that both immature birds sang from high perches in the flight. One was scruffier, having lost many feathers on head and body, and the other was dominant.

During the next two months the first moulted into adult plumage and became the dominant bird, supplanting the other. The female was seen occasionally carrying small twigs. According to the rather sparse literature the natural nests are in cavities. Rolls of wire-netting with long, dead grasses woven into them were put up in the shelter, but the grasses were pulled out and the site ignored. Boxes placed in the shelter also aroused no obvious interest.

In early May a cardboard box with one end partly removed was fixed at the end of a perch in the flight, under a section sheltered by a polythene sheet. The adult-plumaged male sang perched by this box and the female was seen to enter carrying grass blades. Since the Spanish Sparrows were still present a nest was provided for them. This was a section of silver birch log, about 10 in. long by 6 in. external diameter with walls about $\frac{1}{2}$ in. thick. It had been a tit nest-box and the usual round hole near the top was enlarged up to the lid and the whole turned on one side to provide a horizontal cavity with a slit-like entrance on the side at one end. This was hung in an exposed position, on the wire side of the flight, near the door and furthest from the shelter. The Saffron Finches immediately transferred their attention to this. The male sang on top of it or from a nearby perch, and chased off everything else. The Spanish Sparrows went to Herbert Murray who already had a displaying male, and the extra Saffron Finch, who was losing feathers in aggressive encounters and tending to hide, was offered temporary asylum by Leslie Rance.

The singing male finch was seen to pick up fragments of nest material

and hold them once or twice, and in the early stages of nest building was seen to carry material about, but it is not certain that he played any significant part in nest-building. This was done by the female, rather furtively, and a nest became partly visible within the box, at the end furthest from the entrance. An examination later showed it to be a shallow cup of dead leaves and stems and dried grass, lined with finer grasses and feathers. It was so far in that nothing could be seen but by 24th May there were eggs in the nest, the nearest just touchable with a finger-tip. On the Spring Bank Holiday of 26th–28th I was able to observe the female and saw her enter the nest once or twice, but no evidence of brooding. As always the birds were nervous, the thin “tsit” note being constantly heard, but they seemed tamer than previously.

On 7th June when I could feel a young one I realised that each time I or a neighbour appeared in our gardens the male gave the alarm note and the female immediately slipped off the nest and joined him. In view of the amount of time she must have been off the nest it was fortunate that we were enjoying an exceptionally prolonged period of fine hot weather. Incubation must presumably have begun about 24th May. They were more tolerant of birds than humans, for the perch by the nest extended into an adjacent compartment with an Azure-winged Magpie in it, and the constant flights of the latter jogged the nest a little with each movement. Incubation, like building, appeared to be by the female alone.

With the hatching of the young the adults began systematically searching the vegetation of the flight for small insects, but showed little interest in small blowfly maggots when these were offered, although larger maggots were utilized later in the season when the third brood were in the nest. Both adults fed the young. I threw quantities of seeding Forget-me-not weeds infested with aphids into the flight and these were quickly investigated. The young continued to survive, although as in incubation the female left the nest when people were present and showed reluctance to enter with food.

When the young were about six days old I opened the box and pulled one out. It was virtually naked, dull purplish-pink in colour, with a few tiny sparse down tufts on mid-back, one or two on the wings, and a few on the crown of the head. The gape flanges were very pale yellow, the mouth orange. An egg had rolled to the wrong end of the box and was not incubated. It was typical of the species, pale pinkish white, but heavily marked with large spots and specks in dark purplish-brown, hiding much of the ground colour and forming a dense cap at the larger end. There were two young.

On the morning of 22nd the first young one emerged onto the perch by the nest where it sat until late afternoon. Its first flight was quite strong, and it kept to the higher perches. The parents kept up a barrage of alarm calls and when the Azure-winged Magpie in the next aviary showed interest they both flew at it and landed on the wire near it in a manner

suggesting intention of attack. The second youngster emerged next morning and also spent some hours on the perch before moving.

The harsh begging call of the young was heard fairly infrequently. Within two days the hen anxiously inspected the nest-box after I had examined it, and two days after that began to lay, three more eggs being in the box by 29th June, and the last presumably laid on 30th June. The hen showed similar behaviour to her previous incubation although once or twice, on suddenly emerging from the house, I saw her slip out of the nest. The young were fed mainly, perhaps entirely, by the male now. At seven days I saw him occasionally repulse a food-begging youngster, and by ten days they appeared to be feeding themselves, although food-begging could be heard for up to a fortnight.

The second brood had hatched by the evening of 13th July. The parents were again eager for any insects. On this occasion I had some mealworms, and these were taken when offered. As on the previous occasion during the nestling period the adults were seen taking unripe seeds from grasses and weeds in the flight as well as insects. The young of this brood emerged on 29th July, behaving in similar fashion to the first brood. Four young emerged and fledged. The male chased young of the first brood away from the nest-box both during and after occupation by the second brood, but otherwise there was no aggressive interaction with them.

Three days after the second brood emerged the nest had been partly rebuilt, the walls being raised and the cup deepened. The first egg of a third brood was laid on 7th August, young were hatched by 24th, and emerged on 7th September. Five eggs were laid in this instance, and four young hatched and fledged. The weather having turned cooler the nest-box was removed.

Clutches laid were therefore of 3, 4 and 5 eggs; and young hatched and fledged were 2, 4 and 4. Intervals between young leaving nest and the next egg were 4 and 9 days. In the latter stages of the last brood the broken end of the box by the entrance hole fell away and it was possible to see the interior. Throughout the whole period there was complete nest sanitation by the adults both within the nest and the box, and there was no evidence at any time of faeces within the cavity, or immediately below the entrance where they would have fallen if voided at the entrance.

During the period that the third brood were being raised there was some evidence of occasional noisy calling suggestive of song from some of the earlier young. Also during this period the third adult, which had originally been suspected to be a male, and which was being kept elsewhere with some Zebra Finches, indicated its true sex by laying an egg, similar to that of the breeding female but more sparsely marked.

The present data suggest an incubation period of about 13 days, and a fledging period of 15–16 days, followed by about 10 days dependence on the adults. The fledging period seems a little long. It is a difficult

factor to calculate in an aviary breeding since the ease with which the adult can find food and rapidly bring it to the nest may decrease the likelihood that hunger and desire to follow the adult in search of food might help to trigger off the initial departure. From about 10 days onwards the young in the nest seemed to react positively to interference with the box, not by crouching but by huddling back into the darkest corner of the nest and box, the front ones rearing up in the nest to do so. It seems possible that this type of cavity nesting might create a situation where the young could remain longer at the nest site, and be stronger, more active and more successful in their subsequent fledging. They did not appear at the entrance to the box during the days immediately prior to departure as do more typical cavity-nesting birds, and the tendency to emerge onto a nearby perch and to sit there quietly for a long period before attempting to move may be correlated with a need for the emerging youngster to become accustomed to entirely strange surroundings.

Although the period of dependence on the adults seems short, after the last brood emerged and (the nest-box having been removed) the female was present with the young, the food-begging call was heard at intervals for almost four weeks, although this does not necessarily imply that feeding occurred. It may be that when the female is not occupied with a new brood she may be more tolerant of the sustained demands of the young than is the male.

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EXPERIENCES WITH CAPTIVE ALBATROSSES

By G. MICHAEL FLIEG (St. Louis, Missouri, U.S.A.)

We first obtained specimens of Laysan Albatross (*Diomedea immutabilis*) and Black-footed Albatross (*Diomedea nigripes*) at the St. Louis Zoo on 24 March 1966. Six specimens of Laysan and three Black-foots were received. These birds were collected after the breeding season was completed and arrived thin and not unusually aggressive. Our initial attempts at hand feeding were in vain. We then force-fed the birds Smelt (*Osmerus mordax*) and squid supplemented with vitamin A and B complex and salt tablets. Salt was given until the birds excreted salt from the nasal gland as described by Frings (1959). After a period of two weeks the birds began to hand-feed. The birds were individually marked with coloured plastic bands for quick identification. Temperament varied within the group. The Black-foots were the more aggressive whereas the Laysan were semi-aggressive to docile. The dainty Laysans were hand-fed by placing the fish alongside the mandible; when the beak was opened, the fish was slid back into the gullet where it was swallowed whole. The Black-foots hand-fed quite differently as the fish were snapped from the hand when held at the end of the mandible and then worked to the

gullet. At this point the birds were taking up to 60 Smelt per day per bird. We then switched to Herring (*Clupea* sp.) which was a much handier size for hand feeding and does not contain thiaminase which destroys thiamine. Occasional squid were given. The birds were hand fed so that each bird's intake could be recorded and observations concerning their individual behaviour could be noted. As albatross are aggressive feeders they should be fed with care. The razor sharp beak and tearing hook are formidable weapons. One keeper sustained a severe bite which became badly infected resulting in a severe case of blood poisoning. The birds were kept in two indoor cages 5×2 metres with access to an outdoor cage, weather permitting. They were given a salt water solution for drinking but were seldom observed ingesting it. Instead they preferred to drink the fine spray of fresh water from a garden hose. By August only three birds were alive and two succumbed before the end of the year; the last Black-foot died in April 1967. The next group of Albatross were received in January 1967, totalling seven Laysan and three Black-foot. These arrived in poor condition, but were quite heavy as they were taken near the beginning of the breeding season. They were very aggressive and difficult to induce to feed. Even when force-fed they refused to keep a single fish down. These birds died in a short time, but we obtained some valuable information. Due to improper packing containers, (cardboard containers were used) half of the birds shipped died in shipment. We also learned that albatross can be overdosed with NaCl.

Our last shipment arrived in December 1969. Well ventilated shipping containers were built, $100 \times 30 \times 30$ cm, with a door on one end screened with 6 cm hardware cloth for ventilation. The birds were never fed or watered in shipment. Six birds, four Laysan and two Black-foots, arrived in excellent condition. Again the birds were over-aggressive and refused to eat. From our experiences thus far we feel that birds taken after the breeding season respond well to our feeding attempts because they are lean and hungry and when the birds arrive at this time the weather is favourable for giving the birds access to the outdoors for at least a part of the time.

All of the birds were promptly autopsied upon their deaths and the following results were recorded. It was found that contrary to popular belief the birds could be saturated with NaCl and three birds were lost due to salt poisoning. Two birds were lost to Nutritional Secondary Hyperparathyroidism, an imbalance of Calcium and Phosphorus. Aspergillosis in the respiratory tract claimed the lives of some birds, and the virus PPLO was responsible for two deaths.

The treatments administered as a result of diagnosis made through observation or autopsy are as follows.

- (1) A severe gastro-intestinal problem developed which caused the birds to vomit all their food. This was diagnosed by autopsy as aspergillosis and was promptly cured in other birds with mycostatin (Mycostatin).

- (2) PPLO virus was found on autopsy. The birds went down in the legs and were listless. Frings (1969) lists this as a sodium deficiency but this occurred when the birds' salt intake was maximum. An oral cortisone (Azium) was administered along with a tetracycline (250 mg Achromycin) twice daily.
- (3) The fish tapeworm of man was eliminated with Purina Poultry Worming Tablets.

Individual specimens of albatross have been kept in captivity for considerable lengths of time. Washington, D.C. kept a single specimen of Black-foot for almost nine years and a Laysan for over two. Brookfield Zoo holds the record for the Galapagos Albatross (*Diomedea irrorata*) at four years, four months. The oldest age in the wild established by banding records is twenty-nine years for the Laysan and twenty-seven for the Black-foot (Robbins 1961).

ACKNOWLEDGMENTS

The following people were instrumental in helping us obtain albatross for captive studies and without their assistance, nothing would have been possible. Acknowledgment is made to Chandler S. Robbins, Harvey I. Fisher, Hubert Frings, Gordon Boudreau, The Military Airlift Command, especially to Lt.-Col. Dean Gaushe, Lt.-Col. Johnston, The U.S. Navy, especially to Dr. Helen Hayes and Col. C. F. Zirzow and to the Missouri Air National Guard, especially to Col. Moss Rudolf and Col. Robert Campbell, and to the U.S. Fish and Wildlife Service and State of Hawaii for their cooperation in obtaining necessary permits. Finally to Dr. J. D. Wallach for the excellent pathology work and veterinary recommendations.

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- ROBBINS, C. S. 1961. *Western Bird Bander*, 36 : No. 2, 4/61.

PRODUCTS MENTIONED IN THE TEXT:

- MYCOSTATIN — Brand of Nystatin manufactured by Squibb & Sons, E.R., 909 Third Avenue, New York, New York 10022.
- ACHROMYCIN — Brand of Tetracycline manufactured by Lederle Laboratories, 5025 Pattison Avenue, P.O. Box 251, St. Louis, Missouri 63166.
- AZIUM — Brand of Cortisone manufactured by Schering Corporation, 60 Orange Street, Bloomfield, New Jersey 07003.

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BREEDING THE PEACOCK PHEASANTS

By G. MICHAEL FLIEG (St. Louis, Missouri, U.S.A.)

Recently I have had the opportunity to study the captive breeding biology of the Germain's (*Polyplectron germaini*), Gray (*Polyplectron bicalcaratum*) and Palawan (*Polyplectron emphanum*) Peacock Pheasants while working as Curator of Birds—Truli D Farms, Haines City, Florida. All three species were hatched and reared from eggs obtained from seven pairs of Germaine, three pairs of Palawan and three pairs of Gray of various ages. This study is meaningful because of the statistically significant numbers of breeding pairs and data was accumulated on clutch size and clutch intervals in various age birds as well as variations between the three species. Notes were taken on behaviour of the breeding birds and the chicks. I have outlined the procedure for hatching and rearing as well as problems which may occur and their solutions. This account will begin with detailed observations on each species and conclude with general procedures for rearing peacock pheasants. The same procedures may be used for the Roul Roul Partridge (*Rollulus roulroul*).

Generally the Peacock Pheasants go to roost right after sundown. It is at this time that laying hens can be spotted as they stay on the ground rather than going to roost. The hens may appear puffy for a day or two prior to laying. Peacock Pheasant eggs are creamy pink to white in colour. The hen goes to roost after laying or may remain on the egg if it laid when it is near dark. The nest is a simple scrape usually in a corner of the pen or under vegetation. The Palawan may drop its eggs at random. A comparison of the Breeding Data compiled on the three species is shown in Table I.

TABLE I
BREEDING DATA COMPARISON BETWEEN THREE SPECIES OF
PEACOCK PHEASANTS

	Gray	Germaine	Palawan
Number of breeding pairs	3	7	3
Clutch size	1-2	1-2	2
First eggs laid	2/6	2/10	3/5
Clutches produced per pair	3-6	3-6	3-6
Average interval between clutches	13 days	15 days	12 days
Incubation period	21 days	21 days	20 days
Fertility	80%	55%	100%

The Gray Peacock Pheasant is the most docile of the three species. Their pens can be entered carefully without exciting the birds. The cock is bold and doesn't hesitate to display before an audience. This species is the first to lay (Table I). The hen is broody and will protect her second egg. If the eggs are removed, a hen will produce up to six clutches. Yearling pairs are capable of breeding and of three young pairs one produced fertile eggs, the other two did not lay.

The Germain's is the most shy and flighty. The display is rarely seen and most birds are extremely nervous. The oldest hen produced one egg clutches or in the instances where she laid two eggs they were four days apart. All the young pairs laid but the fertility was very poor. Up to six clutches can be produced by a single hen. The male Germaine becomes quite nervous and vocal when the hen is ready to lay.

The Palawan is between the previous species in temperament. This species displays readily but is a bit shyer than the Gray. The cock takes two to three years to attain its full colour but is sexually mature during the first breeding season. The eggs are 100% fertile even among the year-old pairs. Before the hen lays, the cock becomes very irritable and contrary to his nature is flighty.

Eggs of the peacock pheasants are not stored but set immediately as fertility declines quickly. The eggs hatch in 20-21 days. They are placed in the hatcher 2-4 days prior to hatching depending on the air space in the egg. If the egg is dry and the air space large, it is placed into the hatcher early. If the air cell is small, it is put later or allowed to hatch in the incubator. Eggs are turned 45 degrees three times daily. Temperature in the incubator $99\frac{1}{2}^{\circ}\text{F}$ (37.5°C) and Humidity (Wet Bulb) approximately 83°F (28°C). The chicks hatch about 24 hours after pipping. The Palawan chick which is the strongest hatches immediately. The chicks are allowed to dry in the incubator. They are then moved into a brooder box. The box used is 61 cm. \times 61 cm. \times 20 cm. The box is ventilated on three sides. The solid side contains the light bulb which is about four inches from the solid brooder floor. The chicks are started with 100 watt bulb; maintaining the temperature at about $93-95^{\circ}\text{F}$ (35°C). Paper towels are used on the floor. Crumbles of Purina Gamebird Startina and Trout Chow are sprinkled on it. Quart jar waterers are used with marbles placed in the water to prevent drowning. The chicks are started on mealworms; each chick receiving 1-2 worms three times daily from a forceps and are given water from a dropper until they are observed drinking. When newly hatched chicks are introduced to established ones they are placed inside a small circular cage 15 cm. in diameter made of fine hardware cloth. The chick can move around in the mobile cage until the others are used to him. The chicks of the three species are similar in size but differ a bit in colouration and are readily distinguishable to the trained eye. As many as 6-8 chicks can be reared together if they are compatible. We were able to put three-day-old Palawans with 10-day-old Gray and Germain's. The Palawans even at this age are very aggressive and become dominant in the peck order though they are only half the size of the others. Grays on the other hand are the most docile and ignore their cage mates. Male peacock pheasants can be detected as early as three days of age as they display to their cage mates. Germain's are the most difficult to raise and their individual temperaments range from aggressive to docile. This also has to do with

the sex as males are more aggressive. All chicks are handled daily to check the vent and weight. The vent must be kept clean or the birds become constipated. If a bird is encountered with this condition, the water should be treated with Cosa-Terramycin. If crooked toes develop, the chicks can be given a 5 mg. tablet of Vitamin B₂ daily—broken into small pieces and placed deep into the throat with a forceps. If the condition is not remedied in 10 days, spread the toes in natural position between masking tape. In another two weeks remove the tape and the toes will be perfect. During this procedure continue using the B₂ religiously. Initially $\frac{1}{2}$ in. perches should be placed in the brooder. Use dowel pins gradually increasing the diameter as the chick grows. Chicks are kept in the brooder until they are nearly grown.

During this growing period the size of the light bulb must be decreased gradually to 15 watt minimum and the marbles can be removed from the waterer. Cleanliness must be maintained at all times. Paper towels must be changed when necessary and the waterer changed and cleaned daily. The young birds remain tame but fly out of the brooders when they are opened. It is important, therefore, that the brooders be kept in a room or building so that the chicks cannot escape. Mealworms fed individually keep the birds tame. When grown, the birds are transferred to roofed wire bottom cages with shelter in them. Groups of these peacock pheasants can be then introduced together into a large cage and can be kept together for months without problems. Of course, when the breeding season begins fighting will occur and the birds must be separated into pairs or pens of separate sexes and species.

In northern climates peacock pheasants must be kept indoors in the winter if temperatures are lower than 35° F. (1.6° C.). Their life expectancy sometimes exceed 10 years.

PRODUCTS MENTIONED IN THE TEXT

Purina Gamebird Startina and Purina Trout Chow manufactured by Ralston Purina Company, St. Louis, Mo., U.S.A.

Cosa-Terramycin—Brand of Vitamin enriched, water-soluble tetracycline manufactured by Pfizer Laboratories, N.Y., N.Y., U.S.A.

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FOSTERING OF PARROT EGGS AND CHICKS

By GEORGE A. SMITH (Peterborough, England)

The male of my pair of Port Lincoln Parakeets is very tame. (For the purist in taxonomic matters they actually are *Barnardius zonarius dundasi* and not *B.z.zonarius*). This otherwise very pleasing tameness has made him something of a nuisance when breeding. For I cannot enter the flight without being attacked unless I go to the bother of carrying a black catching-net. The white net is practically useless as a prophylactic for it is the blackness which frightens him more than the fear of being caught. And each morning as I do my rounds of giving tit-bits of fruit and protein I have to spend too much time making him pursue my left hand—outside the wire—while my right hand sneaks inside and stealthily changes the pots. Sadly his worse fault, which I believe comes from this almost complete lack of fear, is to courageously climb right to the bottom of the very long and dark nest-box where, if he can, he eats the eggs.

He developed his liking for eggs two days before the first clutch was due to hatch and the two eggs that I rescued were badly cracked. However the repairs made with transparent nail varnish held and one hatched under Indian Ringnecks, *Psittacula krameri*, but it died because they would not feed it, although they are excellent parents with their own chicks. The Port Lincoln managed to eat all the second round after his wife had sat for a full week. But from the third clutch I managed to take three eggs. Two were given to Rock Pebblars, *Polytelis anthopeplus*, and the other put under Redrumps, *Psephotus haematonotus*. All three hatched.

The differences between Port Lincoln chicks and those of Rock Pebblars are very slight. It is mainly that the Rock Pebblars have slightly more white down; have less pronounced barbs to the arrow-shaped tip of the upper bill; and they may be fractionally larger and perhaps slightly less helpless. Indistinct as these differences are the hen Rock Pebblar had no difficulty in distinguishing them for, though she continued to brood the mixed babies, she did not feed the Port Lincolns and one died before I realised this neglect. The second hatched chick was rescued only just in time. At about two days old he was extremely weak and, completely starved of food, he lay partly immersed in a trio of fat Rock Pebblar chicks each with a massive, filled crop. Only one of these well-fed chicks was older than the neglected Port Lincoln. The starved chick was artificially fed with "Farex" and milk and then, not wishing to become its wet-nurse, it was put with the only available parent parrots, which were quite inexperienced Bourke's Grass-parakeets, *Neophema bourkii*, with week-old young. They accepted it immediately. After two more days the third egg under the Redrumps hatched and I waited two days to make positively certain that they were feeding it before I gave them the now seemingly enormous "Cuckoo" Port Lincoln from the Bourke's nest. As a further

experiment I also gave an incubating Yellow-fronted New Zealand parrakeet, *Cyanoramphus auriceps*, two Splendid Grass-parrakeet, *N. splendida*, eggs; and a Barraband, *Polytelis swainsonii*, those of a Gold-mantled Rosella, *Platycercus eximius*. These two foster-parents had previously proved themselves to be good parents. The fostered eggs hatched just before, or in the same period as the fosterers' own eggs, yet like the Ringnecks and Rock Pebbler, they would not feed the fostered chicks although they did not neglect their own.

In the available literature there are many accounts of different parrot species successfully rearing quite alien forms. My personal knowledge includes Redrumps (whose young have thick down and fledge when four or five weeks old) hatching and rearing Indian Ringnecks (whose chicks are born naked and spend almost twice as long in the box) and Budgerigars, *Melopsittacus undulatus*, raising Quaker Conures, *Myiopsitta monachus* until they became too large for the foster parents' feeding ability. (Budgerigar chicks are naked, Quakers are downed and have, like the majority of New World parrots, huge basal swellings to the upper mandible). From the literature we might especially note Fischer's Lovebirds, *Agapornis personata fischeri*, successfully rearing a Splendid Grass-Parrakeet with some of their own chicks (Boosey 1934); Bourke's rearing Princess of Wales', *Polytelis alexandrae* (Harvey 1933); and Brown-throated Conures, *Aratinga pertinax*, fostered from an early age by Budgerigars (Williams 1907). Failures are not often given: West (1955) found that his Cockatiels, *Nymphicus hollandicus*, would not feed Crimson-wings, *Aprosmictus erythropterus*.

Dilger (1960) reports that once Lovebirds, *Agapornis* spp., have had experience of feeding their own youngsters then the sexually differentiated forms he studied—Madagascar *cana*; Abyssinian, *taranta*,—which have white-downed young refused to feed the fresh-hatched chicks of the like-sexed Lovebirds—and vice-versa. It might be noted that the species in which the sexes are similar—Peach-faced, *roseicollis*; Masked, Black-cheeked, Nyassa, Fischer's. *personata* ssp.—have a slightly more dense down with a pink rather than a white colour. But should the parent Lovebirds have had no experience of raising young then they would feed chicks of the other group. He found, by experiment, that when Peach-faced Lovebirds foster-reared as their first brood white-downed species of Love-birds they would not subsequently feed their own pink-downed chicks.

Dilger did not suggest how it is that Lovebirds can distinguish their own offspring. It is unlikely they do it by sight. The difference between pale pink and white would not be made out in the dim light of a nest chamber. And, as Dilger notes, although experienced breeding Lovebirds will not feed fresh hatched chicks of "opposite" forms this discrimination does not apply to older chicks. That is when the visual differences between the chicks are only too obviously apparent. I know of Cockatiels

accepting half-grown Bourke's, and Gold-mantled Rosellas, put in the nest with their own young; yet when subsequently offered fresh-hatched chicks in their next breeding cycle let them die unfed. It is my experience that older chicks, provided they are not too close to fledging, get accepted while in the box.

I believe that this discrimination against alien species comes because a hen parrot experienced in rearing chicks has become attuned to react quite specifically to the noises made by their hungry chicks. If the subsequent chicks cannot give a correct sound then the parent is unable to react and feed it. Neglect is therefore not "purposeful" but a psychological inability to react to "strange" food-begging calls. If this is a correct hypothesis then it must follow, from Diliger's experiment with the Peach-faced Lovebirds, that the first experience that Lovebirds (and most parrots?) have of hatching and rearing their chicks "imprints" them with their specific chick noise for it seems not to be a hereditary knowledge but something that has to be learnt. Following such imprinting the parents can only respond to this or to very similar sounds.

The explanation for the development in parrots of this fine sense of discrimination, to the food soliciting calls of very young chicks, is that without it the smaller and younger members of a parrot brood would probably die of starvation because of excessive attention being given by the parents to the stronger, more actively soliciting, elder chicks.

Parrot hens usually begin the incubation of their eggs before the clutch is complete. The youngest chicks, if they are to survive, must have a greater allure for the parents to feed them than the elder chicks (Smith 1972). The eldest members of a brood, especially with the fast growing, ground-feeding, forms, can be almost of adult size and weight, with feathers, capable of maintaining their own body heat and are fed largely by actively soliciting food from the parents. While the freshly hatched youngest would be less than 10% of adult weight, completely blind easily cooled and almost absolutely incapable of any physical movement except to jerk its head vertically while being fed with its beak held by the parent and of shuffling into sources of heat, the rest of the brood consisting of various intermediates between these two conditions. Elder chicks sound very noticeably different from the babies. Their food soliciting call makes the parents regurgitate and feed, but it is not done with the solicitude they show for the very young. I have repeatedly observed that parrots excited enough to regurgitate food—and some parrots seem to get literally sick with excitement—attempt to feed a noticeable projection, which is usually the bill of another bird. But isolated, sexually active individuals can be seen to feed projecting twigs, knots of wood, spots of paint and even their feet. I have seen a male Splendid call his wife to the hole of the box to be fed and then proceed to feed a projecting nail, rather than her, presumably because it offered more stimulus than her stubby bill. Oddly she swallowed after each "feeding" just as if he

had fed her. An older chick wagging its head and moving its face purposely towards the parent is easily seen and fed for it provides an attracting feature—the bill which in all nestling parrots is light-coloured. But the very young can barely raise their heads. They have to lie because it is source of heat, immured beneath a cluster of their older brethren. They must therefore have a means of attracting the parent hearing it to purposely seek out the source of such a noise, regurgitate pick up its beak and feed it. The noise must therefore be quite distinctive from older chicks and, to a parrot, be most plaintive. It is therefore such an important feature in the successful rearing of large broods that is has become selectively attuned to a very high level of discrimination.

If this is so, and the evidence seems to point that way, then people desirous of fostering eggs of parrots would be advised, if the parrot species are quite dissimilar, to use inexperienced rather than experienced hens for the purpose. Secondly valuable hens that have, for some reason or other, no success in hatching their first round should not be used as fosters for alien forms in case they become imprinted to these and will not, in subsequent rounds, feed their own offspring.

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NEWS FROM THE BERLIN ZOO

By PROFESSOR DR. HEINZ-GEORG KLÖS

This summer we have been lucky in that in the incubator there were hatched 11 Common Rheas (*Rhea americana*), 7 White Rheas and 1 South African Ostrich (*Struthio camelus australis*). Our pair of Australian Silver Gulls (*Larus novaehollandiae*) had another 2 chicks. In the Flamingo-colony, after several hatchings in early summer, there were breeding successes with another European Flamingo (*Phoenicopterus ruber*) and eight Chilean Flamingos (*Phoenicopterus chilensis*).

In addition to the above mentioned species the following birds were hatched:

2 Pacific Brent Geese (*Branta bernicla orientalis*), 2 Black-backed Radjah Shelducks (*Tadorna r. radjah*), 13 European Greater Scaups (*Aythya fuligula*), 4 North American Wood Ducks (*Aix sponsa*), 2 Rock Doves (*Columba livia*), 2 Olive Pigeons (*Columba arquatrix*), 2 Crimson-winged Parrots (*Aprosmictus e.erythropterus*), 4 Grey-breasted Parrakeets (*Myiopsitta monachus*) 1 Fairy Bluebird (*Irena puella*).

New arrivals:

1 Bennett's Cassowary (*Casuarius bennetti*), 1 Little Bittern (*Ixobrychus minutus*), 2 Indian Whistling Ducks (*Dendrocygna javanica*), 4 Fulvous Tree Ducks (*Dendrocygna bicolor*), 2 Lesser White-fronted Geese (*Anser erythropus*), 2 Ross's Geese (*Anser rossii*), 1 Dark Canada Goose (*Branta canadensis occidentalis*), 1,1 Abyssinian Blue-winged Geese (*Cyanochen cyanopterus*), 1 Ruddy-headed Goose (*Chloëphaga rubidiceps*), 1 Ashy-headed Goose (*Chloëphaga poliocephala*), 4 Chilean Teals (*Anas f. flavirostris*), 2 Versicolor Teal (*Anas v.versicolor*), 3 Cape Teal (*Anas capensis*), 2 Cinnamon Teal (*Anas cyanoptera*), 0,1 Australian Shoveler (*Anas r.rhynchotis*), 2,2 European Eiders (*Somateria m.mollissima*), 1 Sacred Ibis (*Threskiornis aethiopica*), 1,1 Green Peafowl (*Pavo muticus*), 1 Thick-billed Green Pigeon (*Treron curvirostra nipalensis*), 2 Emerald Doves (*Chalcophaps indica*), 1 Rueppell's Griffon (*Gyps rueppellii*), 1 Long-eared Owl (*Asio o.otus*), 2 Budgerigars (*Melopsittacus undulatus*), 2 Blue-crowned Motmots (*Momota m. lessonii*), 0.2 Great Indian Hornbills (*Buceros bicornis*), 1 Blue-throated Barbet (*Megalaima asiatica*), 2 Black-necked Araçaris (*Pteroglossus aracari*), 4 Cuvier's Toucans (*Ramphastos cuvieri*), 1,0 Bare-throated Bellbird (*Procnias nudicollis*), 3 White-crested Jay Thrushes (*Garrulax leucolophus*), 1 Collared Jay Thrush (*Garrulax picticollis*), 2 Saffron Finches (*Sicalis flaveola*), 2 Paradise Tanagers (*Tangara chilensis*), 2 Scarlet Tanagers (*Ramphocelus bresilius*), 3 Golden Tanagers (*Tangara arthus*), 1 Blue-grey Tanager (*Thraupis episcopus*) 1 Goldfinch (*Carduelis c. carduelis*), 4 Grey-headed Silver Bills (*Odontospiza caniceps*), 2,2 Long-tailed Grassfinches (*Poëphila acuticauda*), 2,2 Star Finches (*Bathilda ruficauda*), 1,1 Green-backed Twin Spots (*Mandingoa nitidula*), 5 Malabar Mynahs (*Temenuchus malabaricus*), 2 Common Mynahs (*Acridotheres tristis*).

AVICULTURAL SOCIETY FIRST BREEDING MEDALS AND CERTIFICATES, mid-1970 to mid-1973

By C. J. O. HARRISON

Although there is usually an indication at the end of an article in the magazine if it is thought that the account in question is a record of the first breeding of a species in Great Britain or Northern Ireland, it is not always clear if an award has been made; and I have been asked to summarise the more recent awards. I have taken as a starting point here those breedings for which no award had been made by the end of 1970, although the account may have been published in that year. In the list below the year given is that of publication of the account in the magazine.

Medals awarded.

- 1970. (latter half). Lemon-rumped Tanager, *Ramphocelus icteronotus*; Mrs. K. M. Scamell. Ornate Lorikeet, *Trichoglossus ornatus*; J. Bunker. Fawn-naped Tanager, *Tangara ruficervix*; H. Murray.
- 1971. Great Grey Shrike, *Lanius excubitor*; M. D. England. Spotless Starling, *Sturnus unicolor*; K. R. Semple. Malabar Starling, *Sturnus malabaricus*; R. Franklin. Black-headed Caique, *Pionites melanocephala*; G. A. Smith. Rufous-backed Shrike, *Lanius schach*. M. D. England.
- 1972. Jerdon's Starling, *Sturnus burmanicus*; R. Franklin. Blue-streaked Lory, *Eos reticulata*; R. W. Phipps. Hawk-headed Parrot, *Deroptyns accipitrinus*; Mrs. N. Howard.
- 1973. (first half). Red-fronted Barbet, *Tricholaema diadematum*. M. D. England. Rook, *Corvus frugilegus*; P. R. Richards. Ross's Touraco, *Musophaga rossae*; N. R. Steel. Collared Scops Owl, *Otus bakkamoena*; A. Smith.

Certificates of Merit.

- 1970. (latter half). Alpine Chough, *Pyrrhocorax graculus*; Norfolk Wildlife Park (P. Wayre). Grey Touraco, *Corythaixoides concolor*; Jersey Zoological Park (D. G. Roles).
- 1972. Mexican Green Jay, *Cyanocorax yncas*; Thick-billed Euphonia, *Tanagra lanirostris*; Jersey Zool. P. (D. G. Roles). Wattled Starling *Creatophora carunculata*; Harewood Bird Garden (P. B. Brown). Abyssinian Ground Thrush, *Geokichla piaggiae*; Woodland Kingfisher, *Halcyon senegalensis*; Winged World (B. S. Ward). Hispaniolan Amazon, *Amazona ventralis*; Jersey Wildlife Preservation Trust (A. F. Gates).
- 1972. D'Arnaud's Barbet, *Trachyphonus darnaudii*; Toucan Barbet, *Semnornis ramphastinus*; Winged World (B. S. Ward).
- 1973. (first half). Blue-backed Manakin, *Chiroxiphia pareola*; London Zoo (P. Olney). Red-headed Bunting, *Emberiza bruniceps*;

Chester Zoo (W. H. Timmis). Schalow's Touraco, *Tauraco chalowi*; Jersey Wildlife Pres. Trust. (D. G. Roles). Victoria Crowned Pigeon, *Goura victoria*; Bristol Zoo (M. Sherborne).

It will be noted that some breedings, thought at first to be first records, are omitted from the above list. Subsequent letters in the magazine (vol. 73 : 48) indicated that the breeding of the Lesser Sulphur-crowned Cockatoo, *Cacatua sulphurea sulphurea* by C. Smith was not the first, and we were notified of an earlier breeding of the Perfect Lorikeet, *Trichoglossus euteles*, to that of K. Russell; by I. G. Hale in 1969. Notification was also received of earlier breedings of the Crimson-rumped Waxbill, *Estrilda rhodopyga*, and Chester's claim for the Yellow-breasted Bunting, *Emberiza aureola*, has also been queried.

The Gold Coast Touraco, *Tauraco persa*, had already been bred under the name Senegal Touraco by Captain H. S. Stokes in 1932. The oversight here was a simple one, a list being lacking at the time, but more problems are raised when taxonomic revisions of birds result in forms which retain different English names, and which were previously regarded as separate species, being grouped as subspecies of a single species. The rules of the Society allow the award of a medal for the first breeding of a **species**. Other medals may be awarded at the council's discretion for breedings of special merit, but the award for a species must be for what is regarded as a species in the current consensus of taxonomic opinion.

This rule seems to have been overlooked in the past in the case of some parrot breedings, and had led to some confusion, especially since many subspecies are not clearly defined entities. Two breedings during the period under discussion are affected by this. The Double Yellow-headed Amazon Parrot, bred by C. Smith, is now regarded as a subspecies, *Amazona ochrocephala oratrix*, of the Yellow-headed Amazon, the nominate form of which, the Yellow-fronted Amazon, had already been bred by Mr. Smith and for which he had received the Society's medal. The Lesser Patagonian Conure, *Cyanoliseus p. patagonus*, bred at Chester Zoo, is regarded as a subspecies of a species including the Greater Patagonian Conure, *C. p. byroni*, which had been bred in 1963 by W. R. Partridge. Under the rule these two breedings do not therefore qualify as first breedings of a species.

The breeding of Weber's Lorikeet, *Trichoglossus haematodus weberi*, by R. T. Kyme, for which a medal was awarded in 1971 is therefore not an award for a breeding of a species, but a discretionary award for the first breeding of a well-defined isolate of a species of which other subspecies had already been bred. I personally feel that in instances where well-defined subspecies are bred the onus is on the breeder to indicate the degree of difference which he feels is involved, and which might justify an award; although this is difficult in view of the small number of birds usually involved, which tends to exaggerate the individual differences in behaviour which are normally apparent. The final decision, right or wrong, must rest with the Council.

I regret that the breeding at Birdworld of the Casqued Hornbill *Bycanistes subcylindricus*, which falls within this period did not, due to an oversight of mine, come before the Council at its last meeting and must await a later meeting for consideration.

COUNCIL MEETING

A Council Meeting was held on 8th October, 1973, at 32 Bruton Place, London, W.1. The following members were present:

Miss P. Barclay-Smith in the Chair.

Mr. P. B. Brown, Dr. C. J. O. Harrison, Professor J. R. Hodges, Mr. F. Meaden, Mr. H. Murray, Mr. P. J. Olney, Mr. D. Risdon, Mr. R. C. J. Sawyer, Mr. N. R. Steel, Mr. J. J. Yealland.

Mr. H. J. Horswell (Hon. Secretary and Treasurer), Mrs. M. Haynes (Assistant Hon. Secretary).

AWARDS

Certificates of Merit

Woodland Kingfisher, *Halcyon senegalensis*. Winged World, 1971.

Bluebacked Manakin, *Chiroxiphia pareola*. Zoological Society of London, 1973

Red-headed Bunting, *Emberiza bruniceps*. North of England Zoological Society, 1973.

Victoria Crowned Pigeon, *Goura victoria*, Bristol Zoological Society, 1973

Schalow's Touraco, *Tauraco schalowi*. Jersey Wildlife Preservation Trust, 1973.

Casqued Hornbill, *Bycanistes subcylindricus*. Birdworld, 1972.

Medals

Rook, *Corvus frugilegus*. P. R. Richards, 1973.

Ross's Touraco, *Musophagus rossae*. N. R. Steel, 1973.

Red-fronted Barbet, *Tricholaema diadematum*. M. D. England, 1973.

Collared Scops Owl, *Otus bakkamoena*. H. Smith, 1973.

H. J. Horswell,
Hon. Secretary.

SOCIAL MEETINGS—1974

Wine Buffets will be held on the evenings of 21st January, 20th May and 21st October, 1974.

The Annual Dinner will be held on 16th September, 1974.

Details of all these events will be notified to British Members at the appropriate time via insertions in the AVICULTURAL MAGAZINE. Foreign Members who will be in Britain on any of the above dates and would like to attend, should apply to the Hon. Secretary for details.

It is also hoped to arrange at least one visit to a collection during the year.

NEWS AND VIEWS

The three young Sun Conures hatched by A. V. Marques' pair in their second nest have all been successfully reared making a total of five youngsters for 1973.

* * *

J. J. Postema, Gieterveen, Holland who possesses one of the largest and most comprehensive collections of Australian (mainly) Parrakeets in Europe has had another very successful breeding season. In 1973 the following were reared in his aviaries: 8 Eastern Rosella, 12 Blue-checked, 5 Mealy, 12 Brown's, 8 Pennant's, 12 Yellow Rosella, 4 Princess of Wales, 8 Rock Peplar, 3 Barraband's, 4 Cloncurry, 3 Barnard, 3 Crimson-winged, 5 Hooded, 10 Splendid, 6 Turquoise and 6 Red-fronted New Zealand Parrakeets. In addition several mutations have been bred including 6 Blue Masked and 3 Lutino Fischer's Lovebirds, 6 Lutino Ring-necked Parrakeets and about 80 Cockatiels of different colour varieties including White, Pied and "Pearled."

* * *

Mats Tell, Ljungbyhed, Sweden reports his breeding results for 1973. "Despite a very hot and dry summer, most of my birds have nested. However, some of my old reliable pairs failed and so the results were not the very best. Here is the list: 3 Silver-eared Mesias (second generation), 3 Blue-winged Sivas, 2 Redrump, 20 Bourke's and 2 Aymara Parrakeets. There were no Cardinals as I had no room for them. Nevertheless, two young females bred last year laid many eggs from the perches, although I kept them separated from the cocks."

* * *

During the period 1st May-31st August, the following hatchings were recorded at the Jersey Wildlife Preservation Trust: 35 White Eared Pheasants, 3 Brown Eared Pheasants, 3 Blue Eared Pheasants, 2 Palawan Peacock Pheasants (making a total of 3 in 1973), 1 Satyr Tragopan, 2 Red-necked Francolin, 5 Hawaiian Ducks, 6 Laysan Teal, 9 Carolina Wood Ducks, 24 Mandarin Ducks, 6 Red-billed Tree Ducks, 6 Common Shelducks, 2 Hispaniolan Parrots, 3 Thick-billed Parrots, 6 Rothschild's Mynahs (making a total of 9 in 1973) and 3 Snowy Owls. One of the Palawan Peacock Pheasants was reared by its parents in the new Palawan Peacock Pheasant range of aviaries.

Several cases of ornithosis have been diagnosed in human patients recently and almost invariably the source of the infection has been traced to newly imported South American Parrots. Some clinicians believe that the only solution to the problem is the immediate reintroduction of restrictions on the importation of psittacine birds. Most bird lovers would probably welcome such a move not only on medical but also on humanitarian grounds. There can be little doubt that the appalling conditions in which parrots and other birds are being imported and maintained on many dealers' premises are probably the fundamental cause of the present situation.

J. R. H.

* * *

REVIEW

CURASSOWS AND RELATED BIRDS. By JEAN DELACOUR and DEAN AMADON. New York: The American Museum of Natural History. 1973. Price 20 dollars.

The game birds of the family Cracidae are found in the tropics and sub-tropics of the Americas, from the border of Texas to northern Argentina. They are much more aboreal than the pheasants and not so brightly coloured. Many, however, are elegant in shape and have brightly coloured skin ornaments, wattles and crests, on the head. The variation in plumage between a number of different species is often difficult to detect and their classification has had to be thoroughly revised. This has been carried out by the authors, with the help of Dr. C. Vaurie who had previously published detailed studies on this subject.

This book, thanks to the Phipps foundation, is profusely and beautifully illustrated. Both the coloured plates and black and white drawings are by Albert E. Gilbert, and in addition there are four colour plates by George Miksch Sutton and one by David Reid-Henry, three skilled artists whose work would be hard to surpass, and results in a magnificent volume of great attractiveness.

The two distinguished authors give a wealth of documentation of the Curassows, Guans and Chalchalacas, in particular with regard to their characteristics and habits.

The records of these birds in captivity and their breeding as well as information on their care is of especial interest and value to aviculturists

P. B-S

* * *

NOTES

BREEDING OF THE BLUE-WINGED PITTA, *PITTA MOLUCCENSIS*,
AT THE WILDFOWL TRUST

In an article on the Wildfowl Trust published in the magazine recently Mr. T. Johnstone casually mentioned the breeding of the Blue-winged Pitta, *Pitta moluccensis*, in the tropical house. Since, as far as we are aware, there are no records of successful breedings of any species of pittas in Britain as yet, we asked for more details and Mr. Johnstone has supplied the following data—"First nest building commenced on 21st May 1972; first egg on 2nd June. Four eggs were taken away on 28th June and found to be clear. The second nest was built quickly on 30th June. Four eggs were laid by 3rd July. Two hatched on 22nd July. They left the nest on 7th August and one was found dead in the pond on 10th August. The second young one survived. Both parents incubated, brooded and fed the young. There are other pittas and Sun Bitterns in the house, and the adult female Blue-winged Pitta was found dead with a head injury some days after the young hatched."

* * *

HON. TREASURER'S REPORT

We have published this year a Balance Sheet as well as a full Income and Expenditure Account. From the latter you will see that your Society made a loss of £308.42 last year due to rising costs and a fall in Membership.

It has been decided not to increase the Membership fee but to effect economies mainly in the production of the Magazine which we are confident can be done without any fall in the high standard which has been maintained for so long.

We would ask all Members to make every effort to interest others in joining our Society. We would also welcome donations which can be used to increase the number of coloured plates printed or for general purposes, according to the donor's wish. The Society is registered as a charity and a donation in the usual form of covenant will enable us to reclaim tax. This does not apply to subscriptions.

The Balance Sheet, printed for the first time, takes into account printing costs unpaid at the close of the year. The Society has for many years paid its printer in arrears and it has been decided to sell our Bonds to clear up this situation and enable us to renegotiate our printing. This will leave the Society with very little reserves but we are confident that these can be built up again.

I wish to acknowledge a generous anonymous donation of £100 to assist us in carrying out the proposed changes.

H. J. Horswell,
Hon. Treasurer.

BALANCE SHEET

As at 31st December, 1972

As at 31.12.71.		As at 31.12.71.
2199.50	Sundry Creditors	
673.23	Accumulated Fund	
	Balance as at 1st January, 1972	2364.33
	Deficit for the year	673.23
		308.42
		<u>364.81</u>
	British Government Stocks	
	6% British Savings Bonds 1st	135.00
	Conv'. Issue	135.00
	7% British Savings Bonds—2nd	300.00
	Conv'. Issue	300.00
	7% British Savings Bonds—3rd	920.00
	Conv'. Issue	920.00
	7% British Savings Bonds—5th	400.00
	Conv'. Issue	400.00
	7% British Savings Bonds—6th	—
	Conv'. Issue	165.00
	5½% National Development Bonds	165.00
	1st Conv'. Issue	—
	Cash at Bank	952.73
	Sundry Debtors	—
		<u>£2872.73</u>
		<u>£2729.14</u>
		1920.00
		566.53
		242.61
		<u>£2729.14</u>

We have examined the above Balance Sheet and accompanying Income and Expenditure Account together with the books and vouchers in the hands of the Hon. Treasurer and in our opinion the same are correctly drawn up and in accordance therewith.

11th April, 1973

Signed. WALTER H. OURY & Co.
Chartered Accountants,
38, High Street,
Maidenhead SL6 1QF.

EDITORIAL

On January 1st, 1974 I shall be replaced as Editor of the AVICULTURAL MAGAZINE by John Yealland. In this my farewell and expression of thanks to the many contributors who have made my task so gratifying and enjoyable during the 34 years as Editor, I think perhaps I can best summarize my experiences by quoting briefly a few paragraphs from the Editorial I wrote in the 75th Anniversary Supplement published in November 1969, Volume 75, No. 6. After an account of the early days and problems of the Magazine I wrote:

"The situation remained difficult till 1925, after which the Magazine went from strength to strength owing to the great ability and drive of Mr. David Seth-Smith who had served as Editor (sometimes with a co-Editor) from 1901 to 1934, with only an interval of 10 years from 1910-1920.

"It came, to say the least of it, as a surprise when, at an ornithological meeting in 1938 Mr. Alfred Ezra, Monsieur Jean Delacour and Mr. David Seth-Smith came up to me and said, 'We have an additional job for you, we want you to edit the AVICULTURAL MAGAZINE'. 'But I can't', I replied, 'I am not an aviculturist'. 'No matter we will help you.' And that is how it all began. 'Thanks to the efforts of all three I gradually graduated to being an aviculturist.'"

Shortly afterwards the Second World War broke out.

"Like a snail with its shell I took the Magazine with me during my various vicissitudes of the war—typing on rickety tables in billets—correcting proofs during rare occasions when there was a lull during night duty at the Foreign Office, and later finding even the pasting-up of the pages a relief and relaxation from the underground existence deep in the Corsham caves in the production of a new secret aircraft engine. When I lost my home and all my possessions by a direct hit during the Battle of Britain the editorial headquarters of the Magazine were literally a large suitcase.

"During 1940 the standard and size of the Magazine were maintained, but at the end of that year with the fall in income and rise in cost of production it was essential that economy should be made and it was therefore decided to publish the Magazine every second month. With the progress of the war the pinch became tighter, particularly with the advent of paper rationing, and the Magazine became very slim.

"Since the war the Magazine has gradually built up again though with a difference. Most of the great collections of the past have gone, but a new pattern has appeared in the bird parks open to the public . . . which have proved that they can give much interesting information and achieve first breedings, as well as serve as an attraction for the public."

It has always been my aim to maintain a balance between scientific and popular interests and the fact that at the present time articles are contributed from all over the world is gratifying evidence of the wide scope of our journal. This is due to all those who have made it possible, and I would specially like to thank the printers—Messrs. Warren & Sons Ltd., to bring the Magazine to the high standard it now enjoys. Though it would be invidious to mention by name those who have given the greatest help they themselves will realize how much is owed to them and how grateful their Editor is for their unfailing support.

Mr. Yealland will undoubtedly maintain the standard of the Magazine and in future all communications should be addressed to him at: Stoneham Cottage, Cemetery Road, Binstead, Isle of Wight.

PHYLLIS BARCLAY-SMITH.

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